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THE WORKS

OF

SIR JAMES Y. SIMPSON, BART.

VOLUME I.

SELECTED

OBSTETRICAL & GYNÆCOLOGICAL

WORKS

OF

SIR JAMES Y. SIMPSON, BART.

M.D. D.C.L.

LATE PROFESSOR OF MIDWIFERY IN THE UNIVERSITY OF EDINBURGH

CONTAINING

THE SUBSTANCE OF HIS LECTURES ON MIDWIFERY

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AND DISEASES OF WOMEN AND CHILDREN IN THE HOSPITAL SCHOOL OF MEDICINE

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PREFACE.

Having lived for five years with the late Sir James Y. Simpson as his Assistant, and having acquired, by constant association with him during and since that period, an intimate knowledge of his opinions, modes of practice, and writings, I have been requested by his representatives to compile and edit the present volume.

It will be found to contain all the more important of his contributions to the study of Obstetrics and Diseases of Women, with the exception of his Clinical Lectures on the latter subject. These Lectures were published in the *Medical Times and Gazette* (1859-61), and will shortly appear in a separate volume.

In 1855-56 his *Obstetric Memoirs and Contributions* were collected, and re-issued in two volumes, under the editorship of Dr. Priestley of London, and Dr. H. R. Storer of Boston, U.S., when several of the articles were revised, and a few of them re-written by their author. Many of the papers in the present volume are reprinted from that work, but references to the periodicals in which they originally appeared are given in the foot-notes.

His Lecture Notes are now published for the first

time, and contain the substance of the practical part of his Course of Midwifery. For many years it was his intention to publish an outline of his Systematic Lectures, and in 1862 I was engaged with him in incorporating his Lecture Notes with Smellie's *Treatise on the Theory and Practice of Midwifery,* which he had undertaken to edit for the New Sydenham Society. That purpose was, however, ultimately abandoned in consequence of the pressure of his other engagements.

In order to keep this volume within due limits, several articles of inferior interest or importance have been purposely omitted.

In a few instances in which his practice had recently changed, I have ventured to append a short statement of his later views.

J. WATT BLACK.

Clarges Street, London, *June* 1871.

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PART I.

LECTURE NOTES.

NATURAL LABOUR.

Definition.—The head alone presenting. The labour terminated within twenty-four hours.

Three Stages.

1. From the commencement of the process to the complete opening up of the os uteri—The stage of Preparation and Dilatation.

2. From the complete opening up of the os uteri to the birth of the child—The stage of Expulsion.

3. The separation and expulsion of the placenta—The stage of Delivery.

INDIVIDUAL PHENOMENA OF THE FIRST STAGE.

I. Preliminary Symptoms.

These consist of—

1. Increased moisture and relaxation of the vagina—The "Shows."

2. Subsidence of the uterine tumour, and contractions in it.

3. More free state of respiration, digestion, etc.

4. Symptoms of pressure on the bladder, rectum, etc.

5. Often greater difficulty in progression, though greater aptitude for it.

The prognosis from such symptoms is good, especially from marked subsidence of the uterine tumour.

II. Uterine Contractions and Pains.

Occasionally there are uterine contractions without pain, and pains without perfect contractions.

Pains are divided into (I.) True and (II.) Spurious or False.

Treatment of spurious Labour-pains.

This depends on—1. The pathological state inducing them ; 2. The fact of their consisting of irregular muscular contractions.

1. Remove the pathological state exciting the pains, as
   (1.) Constipation, or retention of urine, by enemata, etc.
   (2.) Derangement of the stomach, or diarrhœa.
   (3.) Vascular excitement and plethora, etc.
2. In all cases enforce the supine position for a time.
3. Afterwards suspend, if necessary, the irregular muscular contractions by sedatives, as opium.
4. Before giving opiates have the bowels opened.

III. Gradual Opening Up of the Os Uteri.

The os uteri may be—

1. Relaxed, moist, and equable ; or
2. Firm, dry, and irregular.

The prognosis is the more favourable the nearer the os uteri is to the former state, and *vice versâ*.

IV. Formation of the Bag of Membranes.

V. Rupture of the Membranes.

The period of rupture varies.

The whole ovum may be expelled without rupture of the membranes.

VI. Full Dilatation of the Os Uteri.

Mechanism by which this is effected.

1. Contraction of the parietes of the uterus around the incompressible ovum.

2. Mechanical action of the fluid wedge formed by the bag of membranes.

3. A state of dilatation and dilatability independently of either mechanical or muscular action.

INDIVIDUAL PHENOMENA OF THE SECOND STAGE.

VII. Descent of the Head into the Pelvis.

Its height at the commencement of labour varies.

VIII. Formation of the Perineal Tumour.

(Lengthening and thinning of the perineum.)

IX. Full Dilatation of the External Parts.

X. Expulsion of the Head and Body of the Child.

INDIVIDUAL PHENOMENA OF THE THIRD STAGE.

XI. Detachment of the Placenta.

XII. Expulsion of the Placenta and Membranes.

Management of Natural Labour.

Attend *immediately* when summoned.

The lying-in chamber should be large and well ventilated.

Do not obtrude hurriedly into the patient's room except when the case is urgent.

Information is to be gained from the nurse as to the progress of the case.

Draw the patient into some general conversation.

Avoid all notice of bad cases.

Watch the character, frequency, etc., of the pains.

Prevent others, and prevent the patient herself, from injuring and interrupting the process of parturition.

Communications and suggestions to the patient are to be generally made through the nurse.

Avoid formally proposing an examination.

Different fingers may be employed for examining. The finger or fingers must be previously anointed with lard, pomatum, etc.

The finger is to be rotated in the vagina, so as to turn its radial side forwards.

Purpose of the Examination.—To ascertain the following points :—

1. If the patient is pregnant.
2. If she is in labour.
3. The progress or stage of the labour.
4. The presentation.
5. The state of the os uteri and passages.

Two questions are now generally to be answered—

1. Is everything right?

Tell the more immediate relative everything.

Tell the patient nothing to annoy her.

In first pregnancies do not admit too soon that the patient is in labour.

2. When will the patient be better?

Never venture to give a direct answer unless the case is *very* obvious.

General Summary of Rules regarding the Management of the First Stage.

1. Examine to detect the existence of pregnancy and of labour, its progress, the presentation, and the state of the passages.

2. Repeat the examination as seldom as possible during this stage.

3. In making the examination, introduce your finger or fingers *during* a pain ; but do not complete the examination till after the pain has ceased.

4. Allow the patient to lie or walk about at pleasure till the os uteri is dilated to a diameter of one and a half or two inches.

5. After this period, place her in bed, and upon her left side.

6. Keep the urinary bladder and lower bowel empty.

7. Give the patient nourishment of the lightest form : avoid all stimuli, bodily and mental : endeavour to cheer and support her.

8. Keep the patient cool, and let the room be well ventilated.

9. Prevent her from fatiguing herself or making expulsive muscular efforts.

10. Prevent or palliate any morbid symptoms that supervene, such as—

(1.) Rigors.
(2.) Nausea and vomiting,
(3.) Irritability and despondency.
(4.) Delirium.

General Rules regarding the Management of the Second Stage.

1. Enforce all the preceding rules in regard to ventilation, diet, position, the state of the bladder, etc.

2. Examine as soon as possible after the rupture of the membranes to ascertain if any part has prolapsed, as the cord or a hand.

3. Repeat the examination occasionally, to ascertain the progress of the head.

4. Palliate distressing symptoms, as—

(1.) Pains in the back.
(2.) Cramps or spasms in the limbs.

5. When the head is in the vulva, separate the knees, and support the perineum.

Objections to this practice are chiefly from its abuse.

Advantages gained by the practice—

(1.) It gives relief to the patient.

(2.) It promotes the mechanism of parturition.

(3.) It prevents laceration from too rapid distension.

Let the head pass towards the termination of the last expulsive pain.

Prevent the rapidity of the dilatation from being greater than the degree of dilatability will admit of.

6. Direct the head and body out in the axis of the outlet.

7. Make the head pass in a form presenting the smallest diameter of its ovoid cone at the outlet.

8. Leave the expulsion of the body chiefly to uterine action.

9. Guard and support the perineum during the passage of the shoulders and body.

Duties of the Medical Attendant immediately after the Child is Born.

1. Draw the child from beneath the bedclothes, and immediately arrange the latter, so as to prevent the access of cold air.

2. Pass your hand over the abdomen of the mother to feel if—

(1.) There is a second child.

(2.) The uterus is contracted.

3. Place two ligatures upon the cord, and divide it between them, taking care—

(1.) Not to place the first ligature too near the child's umbilicus lest it constrict an umbilical hernia.

(2.) That the ligature is sufficient when the cord is thick.

(3.) To divide the cord always upon the palm of your hand.

4. See if your patient requires a stimulant, and if there is any tendency to rigors. (There is no necessity for stimulants in common cases, unless the patient is much exhausted.)

General Rules for the Management of the Third Stage.

1. Wait for ten or twenty minutes to see if expulsive pains recur to expel the placenta.

2. Then ascertain if the placenta is in the uterus or in the vagina, by external and internal examination. If you touch the fœtal surface by tracing the cord to its root, it is in the vagina.

3. If the placenta be already in the vagina, extract it.

4. If the placenta be still in the uterus, re-excite uterine contractions by friction, cold or warmth, slight traction at the cord, but, above all, by compression of the uterus.

5. When these means are insufficient, at the end of an hour pass your hand into the uterus and extract the placenta.

6. Make all tractions on the cord, and always extract the placenta itself, in the line of the different pelvic axes.

7. Take especial care to bring away both the placenta and membranes entire.

(If there be hemorrhage you must extract the placenta, or expel it by compression of the uterus, immediately.)

Subsequent Duties of the Medical Attendant in reference to the Mother.

1. Apply immediately a warm cloth to the pudenda.
2. Place a binder upon the abdomen and pelvis.
   (Use but do not abuse the binder.)
3. Remain with the patient for at least an hour.
4. Before leaving her, ascertain—
   (1.) If the uterus is contracted.
   (2.) If the discharge is not too profuse.
   (3.) If there are no marked constitutional symptoms, and if the circulation is neither morbidly depressed nor excited.
5. Guard against the patient leaving the horizontal position, or being exposed to any exciting mental or bodily stimuli.
6. Leave injunctions to be called if faintness, rigors, or continued pelvic pain supervene.

LABORIOUS LABOUR.

Definition.—Head presenting, but morbid degree of retardation and difficulty.

Pathological States inducing Laborious Labour.

1. Deficiency in the expulsive powers.
2. Morbid position, conformation or size of the body to be expelled.
3. A morbidly undilated or contracted state of the canals through which the body has to be expelled.

These states may be present singly or in combination. The degree of difficulty induced by them leads to the sub-division into three *genera* or orders.

Orders of Laborious Labour.

1. *Tedious.*—The natural powers still sufficient, with some accessory regulations or aids from medical art.
2. *Instrumental.*—Extractive mechanical aid required, but safe in principle to both mother and child.
3. *Impracticable.*—Impossible to extract a full-sized or living child through the natural passages.

FIRST ORDER OF LABORIOUS LABOURS—TEDIOUS LABOUR.

A. TEDIOUS LABOUR FROM MORBID PROTRACTION OF THE FIRST STAGE BY LOCAL IMPEDING CAUSES.

Interference is to be regulated by

1. The duration of the labour. The case becomes an anxious

one if the os uteri is not opened in twelve or sixteen hours after regular pains have set in. We may require to interfere much earlier than ten or twelve hours.

2. The power of endurance of the patient.

3. The strength and continuous regularity of the pains.

4. The degree of morbid pressure and irritation upon the os and cervix uteri.

5. The probability of the obstructing cause yielding to the natural efforts.

Dangers to be dreaded from Delay.

1. Exhaustion of the contractile powers of the uterus. Hence
   (1.) Powerless labour.
   (2.) Irregular contraction.
   (3.) Hemorrhage.
2. Irritation and inflammation, or even gangrene of the os uteri.
3. Injury and rupture of the coats of the uterus.
4. Fever—exhaustion—depression of mind.
5. Death of the child.

Local Impeding Causes which may produce Protraction of the First Stage.

1. Rigidity of the lips and neck of the uterus.
2. Rigidity of a band of circular fibres in the cervix.
3. Impaction of a fold of the cervix between the head and the pelvis.
4. Premature rupture of the membranes.
5. Preternatural toughness of the membranes.
6. Over-distension of the uterus by liquor amnii.
7. Occlusion of the os uteri.
8. Oblique position of the os or body of the uterus.
9. Large size of the pelvis, leading to prolapsus.
10. Morbid relaxation of the soft parts, leading to prolapsus.

I. Rigidity of the Lips and Neck of the Uterus.

Varieties.

1. The natural organic state of the parts (especially in first cases).
2. Spasmodic contraction.
3. Induration from disease, as cicatrices, inflammation, cancer.

Treatment.

Constitutional—

1. Bloodletting. This acts by
   (1.) Causing relaxation of the tissues.
   (2.) Removing the tendency to morbid congestion and inflammation, and thus restoring dilatability.
2. Nauseants, as tartar emetic and ipecacuan.
3. Warm baths.
4. Hypnotics, as opiates and chloral.
5. Chloroform.

Local—

1. Local detraction of blood ? ?
2. Local relaxant and sedative medicines. Belladonna ? Stramonium ? ? Chloroform.
3. Unguents and oils.
4. Mucilaginous injections and enemata.
5. Warm hip bath and warm douche.
6. Artificial dilatation by fingers or india-rubber bags.
7. Incision.

OPIUM IN LABOUR.

Indications to be fulfilled by Opium in Labour.

1. To suspend and control irregular and useless uterine pains—when the pains in fact became spurious.

2. To allow the exhausted powers of the uterus to revive by rest (as when a rigid os uteri is dilated after much suffering).

3. To allow the tissues of the os to become relaxed when

there is no fear of pressure, and the patient is not able to bear venesection.

Rules for its Exhibition.

1. Use it only under the conviction that the pains are proportionally more hurtful to the powers of the mother, than useful in the expulsion of the child.

2. Never suspend by it the uterine contractions when they are regular.

3. Also, never when the head is so placed as to cause injurious pressure.

4. Never administer it when there is general vascular excitement.

5. Always have the bowels previously opened.

6. Whatever preparation of the drug is used, and whether it be administered by the mouth, by the rectum, or hypodermically, let the dose be large.

II. Rigidity of a band of Circular Fibres of the Cervix.

Diagnosis.

During a pain, the edges of the os uteri swell, but do not become tense; and the head or the membranes are not in contact with the edges of the os.

During the interval the stricture can be felt, one inch or one and a half inches up the cervical canal, usually at the os internum.

Treatment.

The same as for general rigidity. Press with the fingers during a pain, and stretch the band.

III. Wedging in of a fold of the Cervix between the Head and the Pelvis. (Almost always in front.)

Treatment.

Support and dilate the lip of the os uteri during a pain. When the os is dilated, push up the segment above the head.

IV. Premature Rupture of the Membranes.

To be specially guarded against in first pregnancies.

Treatment.

Remove all other causes of protraction so as to prevent interference with the uterine efforts. Promote relaxation by nauseants and unctuous applications. If necessary, dilate by the fingers, &c., used as an artificial wedge.

V. Preternatural Toughness of the Membranes.

This rarely retards the first stage.

Treatment.

Rupture of the membranes.

VI. Overdistension of the Uterus by Liquor Amnii.

(Hydramnios.)

Symptoms.

Large size and globular form of the uterus, with no irregularities.

Tenseness of the abdominal parietes.

Absence of the fœtal movements.

Rapid increase of the size of the abdomen.

Pain in different parts of the uterus, especially in the groins and pelvis.

Œdema or anasarca of the lower extremities.

Difficult respiration.

On examining *per vaginam,* the inferior segment of the uterus much expanded. Ballottement unusually free and distinct.

Treatment.

Rupture the membranes.

VII. Oblique Position of the Os or Body of the Uterus.

The displacement is most commonly anterior, and the abdomen pendulous. It is apt to lead to impaction of a segment of the cervix uteri.

Treatment.

Place the patient on her back if the displacement be anterior.

Keep the uterus in its proper position by a bandage.

Pull the os into the axis by the fingers ?

VIII. Occlusion of the Os Uteri.

Treatment.

Formation of a small opening by the knife.

IX. Large Size of Pelvis Allowing Prolapsus.

Treatment.

Support the cervix during the pains, so as to let the uterine contractions open up the os fully. Assist by pushing the os over the head if necessary.

X. Morbid Relaxation of the Soft Parts Allowing Prolapsus.

Treatment.

The same as for No. IX.

GENERAL RULES OF TREATMENT FOR THE VARIOUS CASES OF MORBID PROTRACTION OF THE FIRST STAGE BY LOCAL IMPEDING CAUSES.

1. In all cases of morbid protraction of the first stage—
   (1.) Preserve most carefully the patient's strength and spirits.
   (2.) Prevent, as much as possible, all tendency to febrile excitement by attention to diet, ventilation, etc.
   (3.) Keep the rectum and bladder empty.

(In short, ward off all causes likely to interfere with the progress of labour).

2. When the os and body of the uterus are not placed relatively in the proper axis of the brim of the pelvis, rectify the position of the organ by—

(1.) The position of the patient. Place her on her back when the uterus is displaced anteriorly.

(2.) A bandage.

3. In cases of morbid protraction from—(1.) General or partial rigidity of the labia or cervix uteri; or (2.) premature rupture of the membranes, rely principally on—

(1.) Venesection, if there be marked plethora.

(2.) Relaxants and nauseants.

(3.) If necessary, artificial dilatation.

4. When the rigidity is conjoined with general debility, or with spasmodic irritability of the os and cervix, and the pains are hence more hurtful than useful, exhibit opiates.

5. When morbid relaxation of the soft parts, and prolapsus of the uterus exist, support the os and cervix uteri during the pains.

6. When a portion of the cervix uteri is wedged between the head and the pelvis, support it, and push it over the head.

7. When the membranes are preternaturally strong, or the liquor amnii superabundant, perforate the bag.

8. When the os uteri is entirely obliterated, or the labia are so very rigid and diseased as actually to endanger the laceration of the uterus itself, form or enlarge the os by incisions.

B. TEDIOUS LABOUR FROM MORBID PROTRACTION OF THE SECOND STAGE BY OBSTRUCTIONS ON THE PART OF THE MATERNAL PASSAGES.

Obstructions to the Second Stage on the Part of the Maternal Passages.

1. Rigidity and contraction of the vaginal canal and vulva.
2. Distended colon and rectum.

3. Hernia of the intestines within the pelvic cavity.
4. Distended urinary bladder, with or without displacement.
5. Calculus in the urinary bladder.
6. Ovarian tumours.
7. Tumours embedded in the soft tissues of the pelvis.
8. Diseased states of the hard or bony textures of the pelvis.

I. Rigidity and Contraction of the Vaginal Canal and Vulva.

Varieties.

1. Simple undilatability of their structures. (As from advanced age, particular constitutions, or premature labours.)
2. Congestion, tumefaction, and inflammation.
3. Contraction from original malformation.
4. Contraction from acquired cicatrices, adhesions, obliterations, etc.
5. A strong or double hymen.

Diagnosis.

1. Local Examination—Feeling contraction, stricture, cicatrices, heat, dryness.
2. Studying the Effects—Arrested progress of the labour.
3. The anterior history—Previous bad confinements.

Rules of Treatment.

1. In contraction from congestion and inflammation, employ venesection if indicated, unguents, etc.

(*N.B.*—In *all* forms inflammation is apt to supervene. Hence watch to prevent it.)

2. In all others trust much to nature.
3. When absolutely essential divide the obstructing structure by the knife.
4. Make the required incisions during a pain.
5. Avoid frequent examination, or artificial distension by the fingers.

6. In all cases use abundance of local emollients and unguents.

7. Prevent the head from passing, in cases of rigid vulva and perineum, till the parts are fully dilated.

II. Distended Colon and Rectum.

Diagnosis.

1. Examination *per vaginam.* (The tumour is compressible and inelastic, and retains the impression of the finger.)

2. The history of the case. (Constipation—perhaps also slight diarrhœa.)

3. Examination *per rectum.*

Treatment.

1. Enemata.

2. Breaking down scybalous masses by a metallic scoop and removing them piecemeal.

III. Hernia of the Intestines diminishing the Pelvic Cavity. (Pelvic and perineal herniæ.)

Treatment.

1. *Taxis,* while the fœtal head is held up and the patient is in a proper position.

2. If the hernia be irreducible by *taxis,* the early use of forceps is indicated.

IV. Distended Urinary Bladder.

(I.) without displacement.

Diagnosis.

The form of the tumour. Introduction of the catheter.

Treatment.

The use of the catheter. Very rarely puncture of the bladder.

(II.) WITH DISPLACEMENT.

1. Backwards into the vagina.
2. More or less laterally.
3. Between the rectum and the vagina.
4. Forming a perineal hernia.

Diagnosis.

Fluctuation, etc. Use the catheter here and in *all* cases of tumours obstructing labour. (The bladder has been mistaken for the membranes, the head, the impacted lip of the cervix, or tumours.)

Treatment.

1. Use of a flexible male catheter.
2. Reduction of the displacement of the bladder.
3. Hastening of the labour if the bladder cannot be kept from pressure.

V. CALCULUS IN THE BLADDER.

Treatment.

1. Push it above the brim if possible.
2. If this be impossible, and nature insufficient, remove the calculus.

(1.) By extraction, through rapidly dilated urethra.

(2.) By lithotomy.

VI. TUMOURS FORMED BY THE OVARY.

Pathological character.

1. Cystic and multilocular.

2. Cystic and unilocular.
3. Solid—malignant or non-malignant.

Time of the occurrence of prolapsus into the pelvis.

1. Before impregnation.
2. At the fourth month, when the uterus leaves the pelvis.
3. During the commencement of labour, when the parts are relaxed.

Diagnosis.

1. Feeling a tumour in the recto-vaginal space—movable, generally fluctuating, and hard during the pains and when much compressed.
2. The employment of rectal and vaginal examination.
3. The use of an exploring needle.
4. Anterior history of a tumour on one side.

Rules of Treatment.

1. If the tumour be sufficiently loose, push it upwards above the brim.
2. If this be impossible, and yet the tumour be small and compressible, leave the case to nature, avoiding long delay or pressure.
3. If instrumental aid be required, and the tumour be not very large, use the forceps.
4. If there be not space for the forceps, evacuate the tumour (if there be any fluid in it) by puncture or incision, and then trust to the natural efforts, or to forceps.
5. If the tumour be still too large, or if originally solid, perform embryulcia.

Other alternatives proposed—

(1.) Version of the fœtus.
(2.) Cæsarean section.

6. Induce premature labour in subsequent pregnancies.

VII. Tumours embedded in, or attached to, the soft Tissues surrounding the Maternal Passages.

Pathological Varieties.

1. Fibrous tumours in the lower segment of the uterus.
2. Polypi of the labia and cervix uteri.
3. Polypi of the vaginal walls.
4. Follicular tumours of the vagina.
5. Cystic tumours and abscesses in the cellular tissue of the pelvis.
6. Solid non-malignant tumours in the same locality.
7. Carcinomatous tumours of the vagina and bladder.
8. Varicose, condylomatous, and other tumours of the labia pudendi.

Diagnosis.

1. Minute examination of the situation, etc.
2. Use of an exploring needle.
3. In every case empty first the bladder and rectum.

Treatment.

Rules nearly the same as for ovarian tumours.

1. Wait the efforts of nature, and aid them, if necessary, by relaxants, and by compressing and altering the position of the tumour.
2. If the obstruction cannot be thus overcome, gain space—
   (1.) By opening the tumour if there be any chance whatever of its containing fluid.
   (2.) If the tumour consist of recently effused blood, either do not open it until the blood is coagulated, or apply the forceps immediately after incising it.
   (3.) If the tumour be solid and removable, extirpate it.
   (4.) If it be a polypus, use ligature and knife.
3. If the obstruction cannot be thus removed, use forceps, vectis, version, embryulcia, or even Cæsarean section, according to existing circumstances.

VIII. Diseased states of the Pelvic Bones.

Morbid Conformation and Morbid Anatomy of the Pelvis.

1. Varieties in its general size in different races.
2. Varieties in its size and form in individuals.
   (1.) General large size of the pelvis.
   (2.) General small size of the pelvis.
   (3.) Funnel-shaped pelvis—two kinds.
   (4.) The brim of the pelvis cordiform, round or elliptical.
   (5.) Varieties in the depth of the pelvis.
3. Varieties in the inclination and axes of the pelvis.
4. Deformities from mechanical injuries, as fractures or dislocations.
5. Deformities from local disease.
   (1.) Inflammatory hyperostosis.
   (2.) Exostosis.
   (3.) Osteo-sarcomatous tumours.
6. Ossification of the sacro-iliac synchondrosis, and oblique distortion.
7. General disease of the skeleton—
   (1.) Rickets.
   (2.) Malacosteon.

Two general types of deformity—
   (1.) Elliptical.
   (2.) Triangular.

Treatment.

Measures Employed.	If Conjugate Diameter.
Forceps,	$3\frac{1}{4}$ inches.
Embryulcia,	$1\frac{3}{4}$ to $3\frac{1}{4}$ „
Cæsarean section,	$1\frac{3}{4}$ „
Premature labour,	$2\frac{1}{4}$ to $3\frac{1}{2}$ „

The labour is natural but lingering when the antero-posterior diameter is not under four inches.

C. TEDIOUS LABOUR FROM MORBID PROTRACTION OF THE SECOND STAGE, BY OBSTRUCTIONS ON THE PART OF THE CHILD.

Obstructions to the Second Stage on the part of the Child.

1. Shortness of the umbilical cord.
2. Death of the child.
3. Large size of the child.
4. Sex of the child.
5. Strong ossification of the head.
6. Enlargement of the head or body from malformation or disease.
7. Malpositions of the head.
8. Malpresentations of the head.
9. Prolapsus of the upper or lower extremities with the head.

I. Shortness of the Umbilical Cord.

1. Absolute shortness. (It is very rarely below ten or twelve inches.)
2. From convolutions around the child.

It will not interfere with the passage of the head if it be six or seven inches long.

It may prevent the complete extrusion of the body.

If so, divide it.

II. Death of the Child.

This is only a cause of delay when the child is enlarged from putrefaction.

Its bulk, not its death, is the cause in such cases.

III. Large Size of the Child.

IV. Sex of the Child.

V. Strong Ossification of the Head.

Management of III. IV. and V.

1. Trust as long as possible to nature, using all appropriate means to relax the passages, and ward off accidental complications.

2. If nature be insufficient, you must have recourse to instruments.

VI. Enlargement of the Head or Body from Disease: As

1. Hydrocephalus.
2. Hydrorachis.
3. Hydrothorax.
4. Ascites.
5. Tympanites in dead children.
6. Tumours.

Treatment.

1. Let nature complete the case if her efforts be sufficient for it.

2. If danger threaten, and the head be not born, open any tumour upon it, or perforate if there be hydrocephalus.

3. If the head be born, and the body retained, assist by pulling; or, if necessary, by incision or perforation of the enlarged part.

VII. Malpositions of the Head.

(I.) the forehead placed anteriorly to either groin.

(Occipito-posterior positions.)

These cases were formerly considered morbid.

The usual rotation is occasionally absent or imperfect.

(II.) the long diameter of the head in the left oblique diameter of the pelvis.

It is useless and dangerous to alter the position.

(III.) THE LONG DIAMETER OF THE HEAD IN THE CONJUGATE DIAMETER OF THE BRIM.

Occasionally the conformation of the pelvis is such as to permit it.

Management.

Generally no interference is required. If absolutely necessary, the position may be changed by the hand or by forceps.

VIII. MALPRESENTATIONS OF THE HEAD.

(I.) PRESENTATION OF THE SIDE OF THE HEAD.

(II.) PRESENTATION OF THE OCCIPUT.

Diagnosis.

It is recognised by the triangular shape of the occipital bone, the lambdoidal suture, and the posterior fontanelle.

Treatment.

Rectify it if necessary.

(III.) PRESENTATION OF THE EAR.

It is rare.

Two conditions under which it occurs.

1. When the pelvis is very large.
2. When the fœtus is small.

Management.

Rectify the position, if necessary, by the fingers or the hand.

(IV.) PRESENTATION OF THE FOREHEAD.

The chin is too early separated from the chest. The case becomes morbid when the separation is too great, or replacement prevented. It may change into a face presentation.

Causes.

Hitching of the head on the pelvis. The hands or arms lying in front of the neck.

Diagnosis.

The anterior fontanelle is too central. Parts of the face can be felt.

Treatment

Keep your finger in contact with the forehead, so that the uterine efforts may rectify the position. You may, in rare cases, require instruments as the lever.

(v.) FACE PRESENTATIONS.

Varieties.

1. Primitive position before labour.
2. Secondary, from—
   - (1.) Superabundance of liquor amnii.
   - (2.) Obliquity of the uterus.
   - (3.) The occiput hitching against a part of the pelvis.

Two principal positions at the brim.

1. The chin towards the right ilium. The right cheek presents.
2. The chin towards the left ilium. The left cheek presents.

In all cases, as the head descends, the chin turns forwards, and emerges under the pubic arch.

Diagnosis.

1. Negative characters.
2. Positive characters—Frontal suture, nose, mouth, cheek, eyes.

Causes of Delay.

1. Dilatation is not so easily effected.
2. The bones and soft parts do not yield so rapidly.

3. The uterus acts at a disadvantage.

4. The diameters presented are greater—

From the chin to the commencement of the hair, $3\frac{5}{8}$ inches.

" " " middle of the sagittal suture, $4\frac{1}{2}$ "

" " " end " " " $4\frac{3}{4}$ "

From the root of the neck, near the sternum, to the vertex when the head is bent back $4\frac{5}{8}$ "

Management.

1. No active interference is in general required.

2. In very difficult cases attempt rectification, or treat as a difficult cranial presentation.

GENERAL RULES OF MANAGEMENT IN CASES OF MALPOSITION AND MALPRESENTATION OF THE HEAD.

1. Avoid rupturing the membranes.

2. Have the passages as dilated as possible, by relaxants, etc., if necessary, and particularly by preventing the descent of a fold of the cervix uteri.

3. Keep the urinary bladder and the rectum empty.

4. Avert all causes likely to diminish the powers of the uterus.

5. Guard carefully the perineum if the head emerge in an unusual position.

6. As a general rule, leave the process in all deviations of the head to nature ; except in

(1.) Forehead and face cases not entering the brim.

(2.) Imperfect rotation in occipito-posterior positions.

(3.) Mento-sacral face cases?

7. In difficult face cases treat as in difficult cranial cases.

IX. Prolapsus of the Upper or Lower Extremities with the Head.

(I.) Simple Prolapse of One or More Extremities Alongside the Head.

Treatment.

You can generally push the prolapsed part to one side, and thus find space for it by the side of the head.

(II.) MALPOSITION OF THE FOREARM, SO THAT IT LIES ACROSS THE BACK OF THE NECK OF THE FŒTUS.

Diagnosis.

1. The head is pushed down by each pain, but is retracted as soon as the pain passes away.

2. The head can be felt to be neither large nor impacted in the pelvic brim.

3. Pass up your fingers and feel the obstructing arm. (You may mark it with a stick of nitrate of silver, for identification afterwards.)

Treatment.

1. If nature be insufficient, endeavour to bring down the arm by the side of the head, so as to convert the case into one of simple presentation of the head and arm.

2. If that be impossible, turn the child.

D. INEFFICIENCY OF THE EXPULSIVE POWERS OF PARTURITION AS A CAUSE OF TEDIOUS LABOUR DURING BOTH FIRST AND SECOND STAGES.

The expulsive powers consist of—

1. Uterine contractions.

2. Assistant contractions of the diaphragm and abdominal muscles.

I. Inefficiency from General Constitutional Debility.

It seldom produces this effect when original or pre-existing —often when secondary or acquired.

Actual general exhaustion is almost always secondary, and the result of mismanagement.

II. Inertia of the Accessory Expulsive Powers of the Diaphragm and Abdominal Muscles.

1. It is principally influential during the second stage.

2. It may be caused by exhaustion from over-exertion during the first stage, states of the abdominal organs, as the bladder or bowels, diseases of the heart or lungs, paraplegia, the state of the abdominal parietes, overdistension of the abdominal cavity from ascites, etc.

III. Inefficiency of the Expulsive Powers of the Uterus itself.

(I.) from partial, irregular, or spasmodic contractions of the uterus.

Causes.

1. The state of the intestinal canal, as tenesmus, etc.
2. The state of the bladder.
3. Interference with the os uteri when irritable.
4. Sudden relaxation of the uterus from the escape of a large quantity of liquor amnii.

Diagnosis.

1. Sensations of the mother—
   The pains severe and general, or crampish and local.
   The intermission incomplete.
   The pains often leave distressing uneasiness in the back.
   The patient irritable, desponding, or even delirious.
2. Internal examination—
   No effect on the progress of the head in proportion to the suffering or apparent uterine contraction.
   The os uteri sometimes contracts instead of dilating.
   The os uteri is sometimes hot and sensitive.

3. External examination—

You may feel the uterus divided by a band.

. . . . soft at one part, hard elsewhere.

. . . . not entirely relaxed in the intervals between the pains.

(II.) FROM GENERAL INERTIA OR ATONY OF THE UTERUS.

Varieties.

1. The uterine action may be languid, feeble, and sluggish from the very first commencement of labour, in consequence of—

(1.) Constitutional inertia of the organ (in leuco-phlegmatic persons).

(2.) Morbid local inertia of it from too frequent repetition of parturition or miscarriage.

(3.) Organic disease in its parietes.

(4.) Overdistension in cases of twins and hydraminos.

2. The inertia may be superinduced during the progress of the labour by—

(1.) Sudden relaxation from escape of liquor amnii.

(2.) Exhaustion of the uterine fibres from too long action, as *e.g.* from a protracted first stage in the weak (in phthisis, etc.)

(3.) Exhaustion from too strong action induced by obstructions on the part of the fœtus or the passages.

(4.) The supervention of congestion in the uterine vessels. The uterus feels thick and tender; the labia uteri are swollen; the fœtus is very restless, and its movements are painful; the pains are short and ineffective; there are general symptoms of plethora —the face, eyes, skin, etc., red, and pulsations everywhere; there is heat of surface, but little thirst; the patient is restless; there is a tendency to hæmorrhoids, varices, constipation, etc.

(5.) The supervention of inflammation.

(6.) Mental emotions and fears.

(7.) Secondary or acquired constitutional debility and fever. Its danger is greater in the second than in the first stage.

RULES OF TREATMENT IN LINGERING LABOUR DEPENDENT ON INEFFICIENCY OF THE EXPULSIVE POWERS.

1. Avoid and avert the general or constitutional causes that may lead to it.

2. Remove any local mechanical causes that may produce or maintain it.

3. Be careful to husband the patient's strength and spirits.

4. If the accessory expulsive powers be at fault, use an abdominal bandage, and change of position.

5. If there be symptoms of uterine congestion or inflammation present, use venesection, etc., if necessary.

6. If the contractions be irregular and spasmodic, use friction. In the first stage give opium.

7. If the inertia be simple or uncomplicated, excite the organ.

Proposed Means of exciting Uterine Action.

1. The warm bath.
2. Sternutatories.
3. Raising the fœtal head so as to allow the waters to escape.
4. Electricity and galvanism.
5. Abdominal compression.
6. Abdominal friction and bandage.
7. Emetics.
8. Stimulating clysters.
9. Purgatives.
10. Cold applications to the abdomen.
11. Irritation of the breasts.
12. Irritating the os uteri or vagina.
13. Oxytocic medicines.

(1.) Borax.

(2.) Cinnamon.
(3.) Tanacetum vulgare—tansy.
(4.) Gossypii radix—cotton plant.
(5.) Cannabis Indica—Indian hemp.
(6.) Secale cornutum—ergot of rye.

Rules for the Exhibition of Ergot in Lingering Labours.

(1.) Never exhibit it till the first stage is over, or at least the os uteri perfectly dilatable.
(2.) Do not give it even in the second stage if the vagina and external parts be in any degree rigid. Hence it is to be rarely used in first labours.
(3.) Only give it when the passages are fully prepared, and merely some additional expulsive power required.
(4.) If the waters have fully escaped for some time, avoid giving it if there be any probability of delay.

SECOND ORDER OF LABORIOUS LABOURS—INSTRUMENTAL LABOUR.

Pathological Causes.

The same in principle and detail as those of Lingering Labour, viz.:—

1. Deficiency in the expulsive powers.
2. Obstructions on the part of the passages.
3. Obstructions on the part of the child.

In all such cases we allow nature to try her efforts, and only interfere when convinced that she is inadequate.

Circumstances by which we judge of the Propriety or Non-propriety of Instrumental Interference.

1. The duration of the labour, and of its stages.
2. The patient's natural constitution and age, and her state of health at the supervention of labour.

3. The former obstetric history of the patient.

4. Her conduct during the labour, and her state of cheerfulness or depression of mind.

5. The situation, size, etc., of the fœtal head, and the degree of pressure exerted by it upon the passages.

6. The degree of dilatation and dilatability of the passages.

7. Their condition in reference to threatened congestion and inflammation, as shewn by the discharges, etc.

8. The strength of the uterine contractions, and their effects upon the advancement of the head.

9. The local condition of the abdomen and of the uterus.

10. The effects of the labour upon the constitutional state and strength of the patient.

11. The state of the child as shown by auscultation, etc.

General Rules for Non-interference.

Trust to Nature, provided—

1. The uterine contractions still advance the head.

2. There is no injurious pressure from the head, and no marked symptom of irritation, etc. in the passages.

3. The mother's system is not morbidly disturbed.

4. There is no immediate danger to the infant.

Interference is required under a reverse combination of circumstances.

Time for Interference.

As soon as it is certain that interference is necessary, and the passages are in a fit state.

Wait to see what nature can *effect*, not what she can *endure*.

Propositions regarding the Duration of Labour.

1. The maternal mortality attendant upon parturition increases in a ratio progressive with the increased duration of labour.

2. The infantile mortality attendant upon parturition increases in a ratio progressive with the increased duration of labour.

3. The mortality to the mother and infant is tenfold greater in labours prolonged beyond, than in labours terminated within, twenty-four hours; and the mortality to the mother and infant is fifty-fold greater in labours prolonged beyond thirty-six hours, than in labours terminated within the first two hours.

4. The liability to most of the morbid complications connected with labour becomes increased in proportion as the labour is increased in its duration.

5. The liability to febrile and inflammatory affections in the puerperal state increases in proportion as the previous labour has been prolonged in its duration.

6. Individual parturient, and puerperal complications not only thus become more frequent as the labour becomes more prolonged, but in a similar ratio they also become more dangerous and fatal.

7. The mother is more liable to suffer under diseases of the uterine system after long than after short labours.

8. The child, for some time after birth, is more liable to disease and death, in proportion as the labour has been longer in its duration.

9. Some obstetric complications, which in their causation are independent of the length of the labour, are equally liable to occur with short as with long labours.

10. First labours are longer in duration than subsequent labours, and in a proportionate degree more complicated and fatal in their effects to mother and child.

11. Male births are longer in duration than female births, and in a proportionate degree more complicated and fatal in their effects to mother and child.

12. The danger of instrumental delivery depends more upon the previous length and duration of the labour, than upon the operation employed.

Practical Deductions.

1. After a tedious labour mother and infant require more care and watching than usual.

2. During labour, the danger increasing with the duration, we should remove as far as possible any interfering causes.

3. If instrumental delivery be absolutely required, resort to it early.

4. Endeavour to find means to prevent delay.

INSTRUMENTS USED IN CASES IN WHICH THERE IS NO ACTUAL DISPROPORTION BETWEEN INFANT AND PASSAGES.

I. Fingers of Accoucheur.

When the child's head lies long on the perineum, you may help it forwards by one or two fingers inserted into the rectum, and pressing on the head during the pains.

II. Fillet or Lac.

Mode of its application and use.

1. Over the occiput or chin in head cases.
2. Over the body in preternatural presentations.

Objections to its employment and manner of action.

1. It is difficult of application. It requires a considerable space to slip it up by the fingers or by an instrument.

2. We cannot by it accommodate the head to the passages, and thus we may lock the head or produce malpresentation or malposition of it.

3. It acts on one part. It may pull down that part alone, and thus double and cut the neck.

III. Forceps.

Modes of action of the Forceps.

1. By direct traction.
2. By an alternate lateral lever motion.
3. By compression of the fœtal head.
4. By stimulating uterine action.
5. By changing the position of the fœtal head.

Indications for the use of Short Forceps.

1. When, for the safety of the mother, the head in its relation to the passages requires—
   (1.) From its size, an additional compressing and extractive force applied to it; or
   (2.) From malposition, these combined with a rectifying power.
2. When the uterine action is insufficient safely to complete the case.
3. When immediate delivery is required, from some complication threatening the life of the mother.
4. When there is immediate danger to the child, and the passages are sufficiently dilated and dilatable.

N.B.—The fœtal head must have entirely, or nearly entirely, entered the pelvic cavity, before short forceps can be employed. In all cases long forceps may be used instead of short; or, in other words, one instrument may be used for both long forceps and short forceps cases.

General Preliminary Rules regarding the use of Forceps.

1. Be perfectly assured of their necessity.
2. Tell the relatives always; the patient generally.
3. Be cautious in your prognosis regarding the infant.

4. Beware of ever employing them before the os uteri is fully dilated, and the first stage undoubtedly completed.

5. Always empty the rectum and the bladder before forceps or other obstetric operations.

6. Place the patient on her left side, her body across the bed, and her nates at the edge of it.

7. Warm and grease the instrument, and if necessary lubricate the maternal passages.

8. Assure yourself of the precise position and locality of the head of the fœtus.

Rules regarding Introduction of Forceps.

1. Insinuate, do not force on the instrument, and withdraw it partially when any resistance offers.

2. Keep its *point* always in contact with the fœtal head.

3. Introduce each blade so that its concavity adapts itself to the convexity of the fœtal head.

4. Enter and apply each in the proper axis of the pelvis.

5. Introduce the instrument in the intervals between the pains, and always suspend the attempt during the continuance of the pains.

6. Introduce as the first blade—

(1.) The single blade of Ziegler's forceps, and place it *superiorly.*

(2.) The blade whose lock looks *anteriorly,* of Smellie's short and curved forceps, and place it *inferiorly.*

7. Hold the first blade in the right hand, using the left hand as a guide.

8. When it is fully introduced, keep it *in situ* with the thumb and last two fingers of the left hand, and again use the first two fingers as a guide.

9. Introduce the second blade so that it comes into complete antagonism with the first.

10. Withdraw the second blade and re-introduce it, if it be found to be not so adapted to the first.

Rules for Extraction by Short Forceps.

1. Only act during the pains; and if no pains be present, imitate nature by working only at intervals.

2. Give the instrument an extractive power, combined with a lateral pendulum motion.

3. Examine the instrument after every traction, and replace it if it have in any degree slipped.

4. Change the direction of the extractive power in accordance with the axes of the pelvis.

5. Bring the head down always according to the natural mechanism of the particular position.

6. If the head be impacted you may require first to free it by elevating it slightly.

7. Support the perineum very carefully with the left hand.

8. Make the head distend, and pass over it very slowly: allow the uterus itself to complete, as often as possible, the expulsion of the head, and always that of the body.

Indications for the use of Long Forceps.

1. When the fœtal head is arrested at the brim of the pelvis, from—

(1.) Slight narrowing of the brim.

(2.) Large size of the head.

(3.) Malposition of the head.

2. When the head is still at the brim, the membranes burst, and immediate delivery required in consequence of—

(1.) Deficiency of uterine action.

(2.) Sudden complications on the part of the mother.

Differences between Long and Short Forceps.

1. In their construction.
2. In their manner of action.
3. In their place of application.
4. In their mode of application.

Short forceps are applied in relation to the fœtal head.
Long forceps are applied in relation to the mother's pelvis.

Cautions in regard to the Introduction of Long Forceps.

1. Direct the instrument in relation to the axis of the brim.
2. Guard carefully the os uteri.

Cautions in regard to the Mode of Extracting by Long Forceps.

1. Employ them principally as a tractor.
2. Be certain to pull at first backwards, as nearly as possible in the direction of the axis of the brim.
3. In contraction of the pelvic brim and in malposition of the head, take off the instrument after the head is in the pelvis.
4. If the head cannot be moved, the instrument may be left on for an extractor after perforation.
5. Where speedy delivery is required, and no uterine contractions are present, the same hold may be retained till the child is born, unless in occipito-posterior positions.

IV. Vectis or Lever.

Different modes of using the Vectis.

1. As a true lever of the first-class, with the operator's left hand as a fulcrum.
2. As an extractor, and worked as a lever of the third kind. (The instrument should be curved if used as an extractor.)
3. As a single blade of forceps, with the operator's hand serving as a second blade.

Proposed Cases for the Use of the Vectis.

1. All common forceps cases ?
2. Cases of slight contraction of the brim.
3. Cases of malposition of the head, especially—
   (1.) Forehead presentations.
   (2.) Face presentations ?

Rules in regard to the Employment of the Vectis.

1. Attend to the same preliminary measures as in forceps cases with regard to position, etc., etc. (p. 34).

2. Introduce the instrument by the same rules as the forceps (p. 34).

3. When the head has not entered the brim, and in fontanelle and face (?) cases, place the instrument over the occiput or the mastoid process.

4. You may place it over the forehead, face, or chin, when it is used as forceps, and the head is on the perineum.

5. Hold the instrument *in situ* by one hand applied to its handle, and use traction with the other hand applied to its shank.

6. Carefully avoid ever using the mother's parts as a fulcrum.

7. Act only during a pain. The vectis is not to be used when pains are entirely absent.

THIRD ORDER OF LABORIOUS LABOURS—IMPRACTICABLE LABOUR.

Operations Proposed.

1. Craniotomy.
2. Cranioclasm.
3. Cephalotripsy.
4. Cæsarean section.
5. Sigaultian operation.

I. Craniotomy.

Indications.

1. When there is such disproportion between the passages

and the child that the latter cannot be passed through safely for the mother, unless it be diminished in size.

2. When in a difficult case the maternal parts have become too swelled and inflamed for the safe use of forceps.

3. When the short or long forceps might be used, but embryulcia is preferred, because the child is dead ?

4. When delivery is required, and cannot be readily accomplished by forceps or turning.

N.B.—In all cases where forceps can be at all used, try them first cautiously, and if they prove insufficient, you may leave them on the head, perforate, and then use them as a crotchet.

Signs of the Death of the Fœtus.

Many are detailed : most of them more or less dubious.

1. Sensations on the part of the mother—
   (1.) Cessation of the motions of the fœtus.
   (2.) A sense of coldness and weight in the uterus.
2. The state of the maternal discharges, as the escape of—
   (1.) Meconium.
   (2.) Fœtid discharges.
   (3.) Flatus from the uterus.
3. The state of the fœtus as marked by—

Uncertain signs.
- (1.) Want of cerebral pulsation.
- (2.) Desquamation of the cuticle of the scalp, etc.

Certain signs.
- (1.) Emphysema and disintegration of the bones, etc. of the head.
- (2.) Loss of pulse in the funis. There may be a fallacy from twins.
- (3.) Absence of action of the fœtal heart.

Preliminary Measures for Craniotomy.

1. Those regarding the position of the patient, the state of the bladder, the heating of instruments, etc., are the same as for forceps (p. 34).

2. Anæsthetise the patient.
3. Have the uterus fixed by the hand or a bandage.
4. Have a basin and sand to receive bones and brain.
5. Have napkins placed below the patient for brain.

Two Stages in the Operation of Craniotomy.

1. Perforation and breaking up of the cranium.
2. Extraction of the dead infant.

(I.) PERFORATION AND BREAKING UP OF THE CRANIUM.

General Rules regarding it.

1. Use the left hand as a guide and guard for the perforator in the female passages, and work the instrument with the right.

2. Perforate the presenting parietal bone rather than a suture, because—

(1.) The suture may close from compression of the head afterwards.

(2.) We are anxious to break up the bones as much as possible.

3. Take care to place the perforator directly against the part (at right angles), not obliquely, or it will slip up between the scalp and the skull.

4. Effect the perforation by a semi-rotatory boring motion.

5. After the perforator is introduced up to the stop, open it widely and crucially. Repeat this opening, if necessary, again and again.

6. Advance the instrument into the encephalon, and break up fully and well the membranes, brain, and cerebellum—particularly the ganglia at the base.

7. Remove, and always with extreme care, the projecting portions of fractured bone.

8. According as the disproportion between the pelvis and

the head is greater, break down and remove more and more of the arch of the cranium.

9. In breaking down, separating, and removing the bones, do not tear the scalp, but leave it as a protection for the maternal soft parts against the sharp edges of the bones.

(II.) EXTRACTION OF THE FŒTUS.

This is not required in the very simplest cases, the mere diminution by perforation being enough to enable the uterus to finish delivery.

Should we proceed immediately to extraction?

In simpler cases we need not wait.

Advantages, in very deformed cases, from delay, if there be no pains, and if all pressure be removed (Osborne, Hamilton, Meigs, etc.)—

1. The patient's strength recruits.
2. The power of the uterine contractions becomes restored.
3. Incipient swelling and inflammation of the passages abate.
4. The fœtus becomes softened by putrefaction.
5. The presenting part is driven downwards within reach.

In such cases we may wait in general till pains recur. Osborne's thirty hours is mostly too long to wait.

If there be much inflammation of the passages we may wait, if the perforated head do not press injuriously on them.

General Rules for Extraction.

1. See that the bones are as well defended as possible by the scalp.
2. Use the left hand again as a guide and guard, and work the crotchet with the right.
3. Fix the double crotchet like a pair of forceps.

The double crotchet is probably not applicable where the

head is above the brim and the pelvis narrow (as usual) in the conjugate diameter—

(1.) It is not applicable antero-posteriorly, because
  (*a.*) That space is fully occupied (being the narrowest) by the head.
  (*b.*) It is impossible to apply the anterior blade if the promontory of the sacrum, and hence the fœtal head projects far forwards.
(2.) If applied transversely, it does not grasp the head (which could move forwards) when the sacral promontory is projecting.

4. Fix the single and guarded crotchet wherever you have a sufficient and proper hold—

(1.) In simple cases, on the parietal or occipital bones if possible.
(2.) In more difficult cases, in the foramen magnum, or behind the orbit.

5. Test the firmness of the hold before using great extractive power.

6. In extracting, work only during a pain, or if there be no pains, work only at intervals.

7. Endeavour always to extract so as to accommodate the head as much as possible to the form and axes of the pelvis.

8. In the most difficult cases make the occiput or face present.

9. After the head is born apply a towel round it and the neck to pull by.

10. In such cases you may require to perforate also the thorax and abdomen.

SUBSEQUENT STEPS.

1. Prepare the child by stuffing out and sewing up the scalp.
2. Attend carefully to the mother.

(1.) Guard against the shock of the operation, if long, by opiates and stimulants.

(2.) Guard against inflammation and fever following.

(3.) Attend to the state of the bladder and genital canals. Ask after the state of the bladder for a week or two.

(4.) Examine the vagina and see if there are no spicula nor lacerations.

II. Cranioclasm.

Its advantages as compared with Craniotomy.

1. It is speedier and simpler.

2. It saves the passages from the danger of laceration by fragments of the skull.

3. It diminishes the size of the fœtal head more effectually.

4. It fractures and reduces the size of the base of the skull.

5. The extraction of the head, reduced by cranioclasm, is more easy for the practitioner and more safe for the patient.

Rules for the Operation.

1. Perforate, according to the rules for Perforation of the Cranium (p. 40).

2. Introduce the solid blade into the interior of the skull, and pass the fenestrated blade outside over the occipital bone, so as to grasp the bone closely behind the foramen magnum.

3. By a twisting movement, first to one side and then to the other, fracture the occipital bone, and loosen its attachments to the parietal bones.

4. If necessary, pass the blades of the instrument over the two sides of the head successively, so as to fracture and loosen the parietal bones.

5. In some cases apply the blades over the frontal bones, and by the same twisting movement fracture and loosen them.

6. Use the cranioclast as an extractor, according to the rules given for Extraction in Craniotomy (p. 41).

III. Cephalotripsy.

Rules for performing the Operation.

1. First perforate as for craniotomy (p. 40).

2. Pass, apply, and lock the blades of the cephalotribe according to the rules for the Introduction of Forceps (p. 35).

3. Let the blades of the cephalotribe grasp the fœtal head well forwards towards the pubes of the mother.

4. Work the screw so as to approximate the blades of the instrument, and compress and break up the head and face of the child ; and continue the screwing action until the handles of the cephalotribe are brought together.

5. If there be great disproportion between the head and the pelvis, take off the cephalotribe, and re-apply it, so as to seize the head in a different diameter, and again compress and crush by the screw. Repeat this process a third time should extraction be still impossible.

6. After sufficient compression has been effected, retain the hold of the head by the cephalotribe, and use it for completing delivery according to the rules for Extraction by Forceps (p. 36).

7. After the head is born, make traction on the body, so as to deliver it.

8. If the extractive efforts fail, perforate and eviscerate the thorax, and, if necessary, the abdomen ; or crush the thorax and pelvis of the child with the cephalotribe after perforation.

9. When delivery is completed, adopt the same subsequent measures as after Craniotomy (p. 42).

IV. Cæsarean section.

Indication.

Only when the brim is below $1\frac{1}{2}$ or $1\frac{3}{4}$ inches in the conjugate, by 3 inches in the transverse diameter, or when the cavity or outlet is much contracted. (This may be from disease of the bones, or from tumours).

Period for performing the operation.

Before the mother's strength is exhausted.

Principal circumstances in the operation.

1. A heated room.

2. The locality of the incision in the abdominal parietes—in the *linea alba.*

3. The locality of the incision in the uterus—in the body, not in the cervix. Avoid the lateral large vessels.

4. The avoidance of the escape of liquor amnii or blood into the peritoneal cavity.

5. Speedy extraction of the child. Take out its head first.

6. Before removing the hand, open up the os uteri, and

7. Force the uterus into full contraction.

CÆSAREAN OPERATION AFTER THE DEATH OF THE MOTHER.

1. Perform it, if possible, immediately.

2. If practicable, and any doubt exist as to death having occurred, prefer delivery by turning.

V. SIGAULTIAN SECTION, OR SYMPHYSEOTOMY.

Objections.

It is not sufficient in bad cases; for to increase the conjugate diameter 1 inch, the symphysis pubis must separate 3 inches.

½	„	„	„	2	„
3 lines,		„	„	1	„

It is of no use in the common triangular deformed pelvis.

PRETERNATURAL LABOUR.

Definition.—Any part presenting except the head.

Two great orders or subdivisions.

1. Presentations of the breech and lower extremities—*pelvic presentations.*

2. Presentations of the trunk and upper extremities—*cross-births.*

These two are very different in regard to their difficulty, danger, and treatment.

Pathological Causes of Preternatural Presentations.

1. Prematurity of Parturition.
2. Death of the child.
3. Intra-uterine diseases of the fœtus altering its form.
4. Malformations and monstrosities altering the form of the fœtus.
5. Twins.
6. Hydramnios or excess of liquor amnii.
7. Spasmodic contraction in the uterine parietes.
8. Organic diseases of the uterine parietes.
9. Placenta Prævia.
10. Distortion and contraction of the brim of the pelvis.
11. Irregularity in the conformation of the uterus.
12. Mechanical and casual displacements of the fœtus.

Diagnosis of Preternatural Presentations.

1. Indications during pregnancy—
   (1.) The presence of local spasms in the uterus.
   (2.) The shape and size of the uterus.
   (3.) Feeling parts of the fœtus.
   (4.) Sensations of the mother.
   (5.) Stethoscopic signs.
2. Suspicious symptoms during early labour—
   (1.) The os and cervix uteri high in the pelvis.
   (2.) The os uteri dilatable, but dilating slowly and imperfectly.
   (3.) The membranous bag conical and elongated.
   (4.) The presentation not to be felt through the os.
   (5.) Escape of a large quantity of liquor amnii and cessation of the pains.
   (6.) Early rupture of the membranes.
3. The only definite test is *feeling the presentation.*

FIRST ORDER OF PRETERNATURAL LABOURS—PELVIC PRESENTATIONS.

Definition.—Presentations of feet, knees, and nates.

Effects of extractive interference on the mechanism of Pelvic Presentations.

1. Diminution of the requisite expulsive efforts.
2. Forcible dilatation of the passages.
3. Displacement of the arms upwards.
4. Malposition of the head.

I. Footling Presentations.

General Rules of Management.

1. In none attempt to ameliorate the presentation.
2. Preserve the membranes as long as possible.
3. Promote, if necessary (as in first labours), the dilatability of the passages.
4. Allow the uterine efforts to expel the lower extremities and nates.
5. When the child is protruded as far as the umbilicus, pull down a short loop of the cord.
6. If the cord be pulsating well, beware of interfering till the child is expelled as far as the armpits. You may free the hands.
7. If the pulsations of the cord be feeble, or there be spasms of the child, hasten the delivery by traction, but always have the uterine tumour at the same time well compressed through the abdominal parietes.
8. Envelop the protruded parts in a warm cloth, more particularly before using any extractive force.
9. If the arms have slipped up by the sides of the head

bring them down, disengaging first the one which is least difficult.

10. In relieving the arms, pass your fingers as far as the bend of the elbow of the child. Be sure to bring the elbow down over the face and the anterior part of the child.

11. Rectify, if necessary, the position and presentation of the head so as to allow it to pass the brim.

12. In passing the head through the outlet, bring always the chin and nose by one side of the coccyx, and keep the chin depressed on the chest.

13. In assisting the extraction of the head, grasp the neck between the first fingers of the right hand ; place the two first fingers of the left hand along the sides of the nose or in the mouth, inclining the body towards the pubes ; and rotate the head out in the axis of the outlet

MORBID IMPACTION OF THE HEAD IN THE BRIM OR THE OUTLET OF THE PELVIS.

Treatment.

1. Endeavour to rectify its position and relations by depression of the chin and rotation.

2. Allow access of air to the mouth.

3. Use the forceps or lever.

4. If the child be dead you may perform craniotomy or cephalotripsy.

II. Knee Presentations.

Diagnosis.

If in any doubt bring down the foot or hand.

Treatment.

The same as in footling presentations.

III. Breech Presentations.

They are more favourable to the child, and at the same time more difficult for the mother.

Diagnosis.

1. Evacuation of meconium.
2. Negative characters to distinguish the breech from the head.
3. Softness of the breech.
4. The cleft between the nates.
5. The anus.
6. The sacrum and os coccygis—particularly if the parts be swelled.
7. Putting up the finger to feel the thighs of the child.

Treatment.

The same principles to be followed as in footling cases.

Let the breech dilate the external passages slowly.

Carefully support the perineum during the passage of the shoulders and head.

LINGERING OR DIFFICULT BREECH CASES.

The causes and the treatment are nearly the same as in lingering head cases.

Special Rules of Treatment.

1. If the breech have not yet entered the brim, you may bring down the feet.
2. If the breech be already in the pelvis, assist with
   (1.) Fingers.
   (2.) Lac.
   (3.) Blunt hook.
   (4.) Forceps.

SECOND ORDER OF PRETERNATURAL LABOURS—CROSS-BIRTHS.

Definition.—Presentations of shoulder, arm, hand, neck, breast, back, abdomen. The last four are extremely rare.

Diagnosis of Shoulder Presentations.

Negative.
- The shoulder is not so large and hard as the head.
- It wants sutures.
- It is not so round and fleshy as the nates.
- It wants the anus and parts of generation.

Positive.
- The Acromion pointed process.
- The clavicle leading from it before.
- The spine of the scapula leading from it behind.
- The triangular form and mobility of the scapula.
- Placing a finger in the axilla and feeling the ribs, but neither anus nor parts of generation.

Natural terminations of this order of Preternatural Labours.

1. Death of the mother from rupture or exhaustion.
2. Spontaneous evolution or expulsion.

TREATMENT OF CROSS-BIRTHS.

The established rule is to improve and rectify the position, by turning or version.

The only exception to this is when spontaneous evolution or expulsion is fairly in progress.

Different kinds of Version.

1. Cephalic version.
2. Breech version.
3. Podalic version.

I. Podalic Version by Introducing the Hand into the Uterus.

Modifications of Podalic Version, as seizing

1. Both feet.
2. One foot only.
3. One or both knees.

Period of Turning.

When the os uteri and passages are so dilated and dilatable as to allow the hand to pass inwards safely.

Operate if possible before the uterus has contracted around the child.

If the uterus be thus contracted, first relax it.

Preliminary Measures.

1. The same as for forceps as regards the position of the patient, ascertaining accurately the position of the child, emptying of the bladder and rectum, etc. (p. 34).

2. Anæsthetise the patient deeply, especially if the waters have long escaped.

3. Choice of hand to operate with.

4. Preparation of the arm by anointing it, and of the hand by anointing the dorsal surface of it.

5. Fixing of the uterus.

Three Stages of the Operation.

(1.) Introduction of theh and. (2.) Changing the position of the child. (3.) Extraction of the child.

(I.) INTRODUCTION OF THE HAND.

1. Pass it through the vulva as a flattened cone, and (if pains be present) during a pain.

2. Direct it forwards in the axes of the outlet, cavity, and brim.

3. If the os uteri be still small, introduce the fingers through it gradually, and with a dilating motion.

4. Rupture the membranes at or near the os uteri.

5. Advance the hand along the anterior surface of the child. Hence advance it along the front of the child's arm, if an arm be down. If the position of the child be not accurately known, advance the hand where there is least resistance, as this is generally on the anterior surface of the child.

6. If any pushing force be required let the pressure be made on the child, not on the uterus.

7. Always lay the hand flat during a pain.

(II.) CHANGING THE POSITION OF THE CHILD.

1. Apply one hand outside to fix the uterus and assist the version.

2. Seize one or both feet or knees between your fingers.

3. Move the part seized downwards with a slight waving motion, and be sure to bring it over the front of the child.

4. Make these efforts only during the intervals between the pains.

Should we push up the presenting part?

(III.) EXTRACTION OF THE CHILD.

1. Leave the case to nature after the breech of the child has entered the pelvis.

2. Conduct the case now as a footling presentation (p. 47).

3. If it be necessary to hasten the delivery, be sure to keep the contracting uterus in contact with the child's head.

4. Effect the extraction of the head from the pelvis—

(1.) With the hands—by rotating the head out under the arch of the pubes.

(2.) With forceps.

5. We may endeavour to save the child in some cases by admitting air to the mouth. (Bigelow, Meigs, etc.)

SUBSEQUENT DUTIES.

1. Examine the child for any fractures or injury.

2. Watch the state of the mother.

II. Podalic Version without Introducing the Hand into the Uterus.

Cases for attempting it.

All cases where turning is required and the membranes

are unbroken, or at least the waters have only partially escaped.

Rules.

1. Pass two fingers of one hand through the os uteri so as to feel the presenting part, and place the other hand on the fundus uteri.

2. With the fingers in the os uteri gradually push the presenting part to one side, while the other extremity of the fœtus is pushed in the opposite direction by the hand placed on the fundus uteri.

3. Apply the pressure to both poles of the fœtus in the intervals between the pains, and during the uterine contractions endeavour simply to keep it in its new position.

4. Push and tilt the fœtus over in such a direction that its body is flexed and the podalic extremity is bent towards the face.

5. Continue the turning process as part after part comes to the os uteri, until the knees of the child are within reach of the fingers, the breech being at the same time well pushed down towards the maternal pelvis by the hand placed externally.

6. If the membranes be still unruptured, rupture them now.

7. Shift the external hand from the fundus uteri and apply it to the lower segment of the uterus, so as to push the fœtal head upwards.

8. Seize one knee between the fingers, or hook it down with one of them, and draw it through the os uteri.

9. Conduct the rest of the case as one of Turning by the Introduction of the Hand into the Uterus (p. 52).

III. Turning after the Membranes are Ruptured and the Uterus contracted around the Child.

1. Before operating, relax the uterine contraction by—
   (1.) Anæsthesia.
   (2.) Venesection ?
   (3.) Large opiates.

2. Use greater caution than usual.
3. Never remove the child's arm to facilitate the operation.

IV. If Turning be Impossible—

1. Clip through the spine, and double up the fœtus, or
2. Eviscerate the thorax and abdomen, and initiate spontaneous evolution, or
3. Decapitate the infant.

COMPLEX LABOUR.

A. COMPLICATIONS ON THE PART OF THE CHILD.

I. Shortness and Circumvolutions of the Umbilical Cord.
(See p. 21.)

II. Prolapsus or Falling Down of the Umbilical Cord.

Causes.

1. Relaxation or over-distension of the cervix.
2. Large quantity of liquor amnii.
3. Sudden and profuse escape of liquor amnii.
4. Malposition and malpresentation of the child.
5. Slight malformation of the brim.
6 Low insertion of the cord.
7. A certain length of the cord is necessary, but is not a direct cause of prolapsus.

Rules of Management.

1. If pulsation of the cord be wholly stopped do not interfere.
2. If you discover the prolapsus before the membranes burst—
   (1.) Endeavour to return the cord above the head.
   (2.) If this attempt fail, and the passages be well dilated, turn the child. You may do this without rupturing the membranes.
   (3.) Turning must never be attempted if there be any evident danger or difficulty to the mother.

3. If the membranes have already ruptured, and the head be entering, or have entered the pelvis—

(1.) Endeavour to return and retain the cord above the head—

(*a.*) With the fingers.

(*b.*) With a sponge.

(*c.*) With some rough body.

(*d.*) With an appropriate instrument.

(*e.*) By hooking it over a limb of the fœtus.

(*f.*) By placing the patient on her knees and elbows.

(2.) If you cannot return and retain the cord, place it in the most empty sacro-iliac space.

(3.) If necessary, hasten the labour by relaxants, forceps, etc.

(4.) Never venture to turn the child unless the presentation be preternatural.

III. Plural Births.

(I.) simple twin cases.

Signs of the Existence of Twins before Labour.

1. The form, size, etc., of the abdomen.
2. Stethoscopic signs.

Detection during Parturition.

1. Parts of two fœtuses or sets of membranes in the os uteri.
2. The size of the uterine tumour after the first child is born.

We can rarely be sure till the first child is born.

Management of Twin Cases.

1. Conduct the labour of the first child as if a single birth.

2. On detection of the second child tell the attendants—not the mother. Secure the cord. Mark the first child. Apply a binder.

3. If the second child present by the head or by the pelvis, wait one half-hour to see if pains return.

4. If the uterus still remain inactive endeavour now to re-excite it.

5. If there be no return of uterine action in one hour, deliver by the feet.

6. Deliver the second child by turning as soon as the patient's state permits, if—

(1.) The child present by the trunk or upper extremity.

(2.) There be strong indications of hæmorrhage, convulsions, etc.

(3.) The patient have suffered much in the birth of the first child ? ?

7. Re-examine for an additional child.

8. Withdraw the two placentæ as one mass.

(II.) COMPLEX TWIN CASES.

1. TWO SETS OF MEMBRANES IN THE OS UTERI AT THE SAME TIME.

Treatment.—Carefully preserve that least protruding.

2. PARTS OF TWO CHILDREN AT THE SAME TIME IN THE PASSAGES.

(1.) Both heads at the brim.

(2.) The feet of both at the brim.

(3.) The head of one child and the feet of the other at the brim.

There may be impaction in this case.

Treatment.

If nature be insufficient—

(1.) Remove the first child from the passages (by decapitation, etc.) if it be dead.

(2.) Reduce the head of the second child if the first be still alive.

3. ONE FŒTUS EXTRUDED BEFORE THE PERIOD OF VIALIBILITY.

Treatment.—Allow the pregnancy to go on if the placenta of the extruded child have come away, but not otherwise.

(III.) MONSTROSITIES BY EXCESS.

Treatment.

1. See what nature can effect.
2. If necessary amputate the protruded part, and turn. Make a very careful examination before doing this.

B. COMPLICATIONS ON THE PART OF THE MOTHER.

(*A.*) HEAD COMPLICATIONS.

I. Apoplexy.

It rarely occurs in parturient females.

II. Puerperal Convulsions—Eclampsia.

May occur (1) before, (2) during, or (3) after labour.
Before the seventh month they are almost always hysterical.

Supposed Causes of Convulsions.

1. Plethoric condition of pregnancy.
2. Difficult labour.
3. State of the atmosphere.
4. Dropsical diathesis.
5. Albuminuria.
6. Toxæmia.
   - (1.) Blood charged with urea.
   - (2.) „ „ „ carbonate of ammonia.
   - (3.) „ „ „ kreatine and extractive matters.
   - (4.) „ „ „ alkaloidal poisons.
7. Hydræmia leading to œdema of the brain under increased blood-pressure in the arteries.

Premonitory Symptoms.—Those of Albuminuria.

1. Dropsy of the hands and face.
2. Headache and other pains.

3. Lesions of the senses, and paralyses.

4. Nausea, vomiting, diarrhœa, cramps, etc.

General Rules of Treatment.

1. Loosen the patient's dress, raise her head, prevent self-injury, and allow access of fresh air.

2. Bleed largely, and again if necessary ? ?

3. Apply cold to the head.

4. Open the bowels freely and speedily.

5. Act, if possible, on the kidneys.

6. Keep the circulation depressed by tartar emetic if it be in any degree excited.

7. Avoid antispasmodics and opiates in general.

8. Subdue the excitability of the nervous system by chloroform.

9. If the passages be in a fit state use forceps, especially if there be repeated paroxysms.

10. If the fœtal head be high, and the passages unprepared, rely on time and relaxants; but if there be imminent danger, deliver by long forceps, turning, embryulcia, or incision of the cervix. Should ergot be given ?

11. When there is albuminuria before labour, induce labour if the symptoms be very marked and severe.

12. In the after-treatment keep the patient low and quiet (by tartrate of antimony, etc.), and the bowels and bladder free. Counter-irritate in some inflammatory cases.

13. In subsequent pregnancies, on the first attack threatening, avert it by keeping down the circulation, and by alkaline salts.

14. Use purgatives and antispasmodics in hysterical convulsions, and stimulants in those arising from loss of blood.

(*B.*) CHEST COMPLICATIONS.

I. Emphysema.

II. Bronchitis.

III. Pneumonia.

IV. Pleurisy.

V. Organic Disease of the Heart and Large Bloodvessels.

VI. Syncope.

General Rules of Treatment in Chest Complications.

1. Avoid everything specially which would heat, fatigue, or oppress the patient.

2. Prevent her using any muscular exertion to promote labour.

3. If the symptoms be at all urgent, have the passages dilated, and deliver by forceps.

4. Do not empty the uterus too suddenly.

5. Apply a binder previously, and tighten it as the uterus is evacuated.

6. When thoracic congestion or inflammation is threatened, avert or subdue it by venesection, or by vascular sedatives.

7. In double bronchitis you may require to keep the air tubes free by an emetic.

(*C.*) ABDOMINAL COMPLICATIONS.

I. Ascites.

It generally affords no great impediment to delivery. It may necessitate the induction of labour in the last months.

II. Tumours.

They may be situated in various organs. Most frequently they are ovarian.

Treatment.

1. If they obstruct the brim of the pelvis, or if they induce dangerous dyspnœa by their size (conjoined with the enlargement of the uterus), you may require to induce premature labour.

2. If not, allow nature to proceed.

3. Avert inflammation in them during gestation, labour, and the puerperal state by appropriate means.

4. Hasten the labour if the tissues of the tumour be too much compressed or irritated during labour.

III. Hernia of the Intestines.

Treatment.

1. If the hernia be reducible, keep it up by your own hand, or by that of an assistant, during the whole process, and particularly at the moment of delivery.

2. If it be irreducible, prevent by the same means a greater protrusion.

3. If it offer to become strangulated hasten delivery by appropriate means.

IV. Displacements of the Uterus.

(I.) inguinal hernia of the uterus.

(II.) umbilical hernia of the uterus.

Treatment—Alternatives.

1. Reduce the hernia if possible.
2. Hold the uterus up in the proper axis of the brim.
3. Turn.
4. Perform Cæsarean section.

(III.) prolapsus of the uterus.

Treatment.

1. Empty the bladder, and if possible reduce the prolapsus.

2. Support the os uteri during the pains.

3. If the os uteri do not at length open, incise it.

(IV.) INVERSION OF THE UTERUS.

Symptoms.

1. Great constitutional shock—Pulse small and weak—face pallid, etc.—faintness or syncope.
2. Pain.

Diagnosis.

From the symptoms, and a conjoined examination above the pubes, and *per vaginam.*

Results.

1. Danger from shock.
2. Hæmorrhage.
3. Inflammation and sloughing.
4. Chronic prolapsus and discharge.

Treatment.

1. Always reduce the inverted organ as speedily as possible. Should we first remove the placenta or not?
2. To retain the reduced organ excite the os uteri into full contraction before removing the hand.
3. If the first attempt at reduction fail, repeat it cautiously from time to time.
4. If all attempts fail, treat the case as one of common prolapsus.
5. If, afterwards, the health become ruined by the discharge, you may have to remove the prolapsed organ.

V. LACERATIONS OF VARIOUS ABDOMINAL VISCERA.

(1.) Spleen. (2.) Liver. (3.) Cæcum. (4.) Hypogastric vessels. (5.) Internal iliac vein. (6.) Urinary bladder.

VI. RUPTURE OF THE UTERUS.

Period of its Occurrence.

1. During pregnancy.

It may be mistaken for extra-uterine pregnancy.

2. During labour.

It occurs most generally during the first twelve hours. It may take place even before the membranes burst.

Causes.

During pregnancy—

1. Injury.
2. Diseases of the uterus.

During labour—

1. Direct injury from instruments or turning.
2. Inordinate action of the uterus, particularly when arising from obstructions to the passage of the child.
3. Previous disease of the uterine parietes.

Its effects are heightened by inordinate uterine action, by obstructions on the part of the passages, or by malposition of the child.

We can never predict the degree of action a diseased uterus will sustain.

Seat of the Rupture.

Any part of the uterus. Generally it is in the cervix and the top of the vagina, and on the posterior or the anterior part, opposite the promontory of the sacrum and the symphysis pubis.

The cervix is the most frequent seat, because the part most pressed upon and distended by the head. It is naturally the thinnest, and forms an angle to receive the force of the uterine contractions.

Direction of the Rupture.

Longitudinal—oblique—often transverse.

Extent of the Rupture.

Complete; or incomplete, as involving the mucous and muscular coats only, or as involving the peritoneum only.

Premonitory Symptoms.

Before labour—

1. Metritis (*ramollissement*) during pregnancy, and especially if opposite the promontory of the sacrum or the pubes.

2. Injury of the uterus in previous labours (as Cæsarean section or laceration), or during the present pregnancy or labour.

3. The present labour not a first, and former labours difficult from slight contraction of the brim.

During labour—

4. The labour obstructed and tedious (as from pelvic contraction, cicatrices, hydrocephalus, arm-presentation, etc.), especially if not so in previous labours.

5. The pains severe in *character*, but not in their *effect* upon the advance of the head.

6. Crampish, and great pain opposite the promontory of the sacrum or the pubes.

7. Co-existent cramps in the lower extremities.

Symptoms.

They are varied by the extent of the laceration (complete or incomplete), by the rapidity of the laceration (sudden or slow), and by the seat of it (in neck or fundus, interior or exterior).

When the laceration is complete and rapid—

1. Pain and a *feeling* of laceration in the part lacerated.

2. Abdominal pain and tenderness ; and distension *after a time.*

3. The shape of the child and of the uterus to be felt.

4. Recession of the presentation.

5. Diminution or arrestment of uterine action.

6. Hæmorrhage from the vagina.

7. Death of the child.

8. Constitutional symptoms.

   (1.) Shock, small pulse, cold skin, etc.

   (2.) Sympathetic vomiting (dark coloured).

When the laceration is slighter and slower—

1. Existence of predisposing and exciting causes.
2. Constitutional effects.

Diagnosis.

1. The above-mentioned symptoms.
2. Feeling the laceration by vaginal examination.

Treatment.

1. When there are any suspicious premonitory symptoms promote delivery; or, if necessary, diminish or suspend the violence of the labour-pains.
2. Effect immediate delivery as soon as a rupture occurs.
   (1.) If the child's head be in the pelvic cavity or brim, fix the uterus, and use forceps (long or short), or crotchet.
   (2.) If the head be too mobile for forceps or crotchet perform version.
   (3.) In turning in cases of rupture of the uterus, secure if possible both feet.
   (4.) Empty the uterus with the hand to prevent the intestines from being strangulated in the rent, or the escape of the lochia, etc. Contract the uterus well by irritation with the hand.
   (5.) Afterwards use sedatives, stimulants, and antiphlogistics, according to circumstances.
3. Should we ever use gastrotomy instead of turning?

Turning as a general rule is improper or impossible—

(1.) In accidental rupture during pregnancy.
(2.) During labour when the os uteri is not open.
(3.) During labour when the pelvis is too much contracted for turning.
(4.) When the child has escaped into the abdominal cavity.

Exceptions exist when the diagnosis is uncertain or the passages can be forced.

VII. LACERATIONS IN THE PERINEUM AND VULVA.

Varieties.

1. Longitudinal.
2. Oblique.
3. Central.

Treatment.

1. In slighter cases use cleanliness and quiet, and keep the limbs together by a binder round the knees.
2. In more severe cases—
   (1.) Place the patient so that the discharges, etc., do not run into the wound.
   (2.) Keep the edges in contact by metallic sutures.
   (3.) Keep the bladder empty by the catheter.
   (4.) Regulate the bowels according to the constitution of the patient. Generally give opiates.
   (5.) If these means fail, effect re-union by subsequent re-vivification and suture.

VIII. Uterine Hemorrhage.

Periods at which it may occur.

1. During the first six months (abortion).
2. During the last three months.
3. During the first two stages of labour.
4. Between birth and "deliverance."
5. After the expulsion of the placenta.

(I.) HEMORRHAGE IN THE LAST MONTHS OF PREGNANCY AND FIRST TWO STAGES OF LABOUR.

Varieties.

1. Unavoidable.
2. Accidental.

(I.) Unavoidable Hemorrhage from Presentation of the Placenta.

Synonyms.—Placenta Prævia—Placental Presentation.

Local Symptom.

Hemorrhage at the 6th, 7th, or 8th month, or at the full time, unpreceded by accident, and greatest with each pain.

Constitutional Effects of the Discharge.

In moderate Hemorrhage—

1. In the heart and arteries.—The pulse feeble and quick—a feeling of faintishness and languor.
2. In the capillaries.—Paleness of the face and lips—coldness of the surface.
3. In the encephalon.—Vertigo—tinnitus aurium—impaired vision.
4. In the stomach.—Sympathetic sickness and retching.
5. In the respiration.—Sighing.

In more severe Hemorrhage—

1. In the heart.—Faintness repeated.
2. In the arteries.—The pulse very feeble, quick, imperceptible.
3. In the capillaries.—Pallor of the lips and face—rigors.
4. In the encephalon.—Noises—flashes of light—incoherence—convulsions.
5. In the stomach.—Repeated vomiting.
6. In the respiration.—Jactitation—dyspnœa.

Treatment of Unavoidable Hemorrhage.

palliative treatment.

This is to be employed if the hemorrhage be slight, and pregnancy not completed.

1. Recumbent position.

2. Quietude and removal of all stimuli.
3. Free ventilation—coolness—few bedclothes.
4. Refrigerants and astringents—ice—acetate of lead—antimony? (if great vascular excitement).
5. Allay the uterine contractions—give opium with the lead.
6. Local means—plug?—cold—styptic injections.
7. Watch or be within call.

RADICAL TREATMENT.

This is to be resorted to if the hemorrhage be severe, or the full time arrived.

1. Evacuation of Liquor Amnii.

This is principally successful in partial presentations; not often when the presentation is complete.

2. Artificial Delivery of the Child.

(1.) *Artificial Delivery by Turning.*

The operation is more easily performed when—

(*a.*) There is a relaxed state of the os and passages.

(*b.*) The child is alive.

The time of Turning is regulated by circumstances—

(*a.*) It is not to be regulated by the pains. The pains are no guide—they are often wanting in the worst cases.

(*b.*) It is to be regulated by the state of the passages.

(*c.*) It is to be regulated by the strength and danger of the mother.

(*d.*) It is to be regulated by the previous amount of flooding. It is the loss of the last few ounces which proves fatal.

Cautions.—

(*a.*) Do not operate too early lest laceration of the os take place.

(*b.*) Perform the operation if possible without introducing the hand into the uterus.

(*c.*) In introducing the fingers or hand pass by the side of the placenta, not in general through it.

(*d.*) Force the uterus into subsequent full contraction.

(2.) *Artificial Delivery by Embryulcia.*

In partial presentation cases, where the os is too small for turning.

(3.) *Artificial Delivery by Forceps.*

If the head be down, and hemorrhage still go on, forceps should be used.

3. Complete Separation of the Placenta.

This is the principle of practice attempted by nature.

It is performed artificially by the finger or by the uterine sound.

To insure complete separation the placenta should be extracted.

Separation of the placenta is safe compared with turning. The proportion of deaths in turning is 1 in $2\frac{1}{2}$.

Causes of this high mortality—

(1.) Waiting till the os is relaxed.

(2.) Laceration of the os and cervix.

Hence—

(1.) Death from hemorrhage.

(2.) Death from phlebitis.

Cases in which Separation and Extraction may and should be followed.

(1.) When the child is dead.

(2.) When the child is not yet viable.

(3.) When the hemorrhage is great, and the os uteri is not yet sufficiently dilated for safe turning. This was the state in 11 out of 35 cases. (Lee.)

(4.) When the pelvic passages are too small for safe and easy turning.

(5.) When the mother is too exhausted to bear turning.

(6.) When evacuation of the liquor amnii fails.

(7.) When the uterus is too firmly contracted for turning.

4. Partial Separation of the Placenta.

This is to be adopted as a minor measure in all cases before complete separation is had recourse to, unless when the child is certainly dead, and much blood has been already lost.

Rules for Partial Separation.

(1.) Pass the finger or a sound through the os uteri, and separate a little of the placenta all along the line of its detachment from the uterus.

(2.) Separate especially any portion where the placental tissue can be felt to be on the stretch.

(3.) If the hemorrhage return after having been repressed for a time by partial separation of the placenta, again endeavour to repress it by separating an additional portion.

(4.) If partial separation of the placenta fail to arrest the hemorrhage, proceed to complete separation.

(II.) Accidental Hemorrhage.

TREATMENT.

Repress it if possible by the usual palliative measures. If these prove insufficient have recourse to—

1. Plug??
2. Rupture of the Membranes.

Objections—

(1.) In some cases it is insufficient, as where a portion of the child is not opposite the bleeding part to act as a compress.

(2.) The delay till the uterus contracts is dangerous to the mother.

(3.) It increases the difficulty and danger of turning.

3. Artificial delivery.

Rules of Treatment.

(1.) Whenever the hemorrhage is very severe, and the danger great, dilate the os uteri, and deliver if the state of parts at all allow it. In very bad cases incision of the os may be required for immediate turning.

(2.) If the hemorrhage be more slight, or the os uteri and passages rigid, rupture the membranes.

(II.) HEMORRHAGE IN THE THIRD STAGE OF LABOUR.

(RETENTION OF THE PLACENTA.)

Causes of Morbid Retention of the Placenta.

1. Morbid adhesion of the placenta to the uterus.
2. Hypertrophy of the placental mass.
3. Irregular contraction of the uterus.
4. Inertia of the uterus.

(I.) Morbid Adhesion of the Placenta to the Uterus.

Treatment.

1. Always empty and contract the uterus as speedily as possible whenever there is hemorrhage in the third stage.

2. Pass your hand, under the same rules as in turning (p. 51), and cautiously separate the placenta from the uterus.

3. Extract the placenta when separated, and before removing the hand force the uterus into contraction.

4. If it be impossible to remove the whole placenta, remove carefully all that can be got.

(II.) Hypertrophy of the Placental Mass.

Enlargement of the placenta to such an extent as to produce retention is extremely rare.

Treatment.

If any treatment be required a little pressure or traction will generally suffice. Should it be necessary, introduce the hand and extract.

(III.) Irregular or Hour-glass Contraction of the Uterus.

Causes.

It generally arises from mismanagement in the previous stages, as from allowing the first stage to be too prolonged, or from extracting the body of the child too rapidly after the birth of the head.

Diagnosis.

1. Pains are present, but the umbilical cord does not lengthen.
2. The cord yields on pulling, and again springs back.
3. The shape of the uterus may be felt externally.
4. The contraction can be felt by examination *per vaginam.*

Treatment.

1. If the stricture be easily dilatable and the placenta half out, extract immediately.
2. If the stricture be not thus dilatable, chloroform the patient deeply, and dilate it by introducing the fingers one after another. Instead of relaxing by chloroform, you may give an opiate enema, and then extract after half-an-hour.
3. Push down the fundus uteri by the one hand placed externally, while the other hand is used to dilate the stricture.
4. As you extract the placenta, irritate the uterus with your hand, so as to force it into complete contraction, and keep up steady compression with the hand placed externally.

(IV.) Inertia or Atony of the Uterus.

This is the most common source of retention of the placenta.

Causes.

Protraction of the labour, pulling out the child, etc.

Diagnosis.

The uterus felt large and relaxed, though regular, and no pains present.

Treatment.

1. General and local stimulants are usually sufficient, as wine or brandy, ergot, external friction and compression of the uterus, tractions on the cord, the shock of a cold cloth, or the alternate application of heat and cold.

2. Sometimes the placenta requires to be removed by the hand.

Occasionally the placenta is retained at the os uteri by atmospheric pressure, and cannot be readily extracted till an edge is drawn down.

(III.) Hemorrhage after Delivery of the Child and Placenta.

It generally occurs within the first hour.

It may be accompanied or not by external discharge.

The contraction of the uterus is generally slight, but irregular.

Causes giving Liability to this form of Hemorrhage.

1. Tedious or instrumental labour.
2. Relaxed state of habit.
3. Plural births.
4. Peculiar conformation or morbid adhesion of the placenta.

5. Disease in the walls of the uterus.
6. Peculiarity of constitution.

Modes of Discharge.

1. By gushes.
2. By slow draining.

Rules of Treatment.

1. Force the uterus into full contraction by—
   (1.) External stimulation and compression through the abdominal parietes. The uterus may sometimes be grasped between the two hands, one placed behind and the other in front of it.
   (2.) Internal irritation, by the introduction of the hand.
   (3.) Compression from within and without.
   (4.) Sudden shock from cold—externally or internally.
2. Keep the uterus contracted by—
   (1.) Hand, or firm binder and compress.
   (2.) Ergot of rye.
3. If it become necessary apply hæmostatic remedies to the interior of the uterus by means of a syringe or a sponge.
4. If the foregoing measures fail, compress the aorta. This is especially indicated in organic diseases of the uterus, as fibroid tumours.
5. Carefully remove all coagula from the vagina and cervix uteri, as well as from the cavity of the uterus.
6. In extreme cases have recourse to transfusion of blood.
7. Adhere in this and in other cases of severe hemorrhage to the following rules of treatment.

AFTER TREATMENT IN ALL CASES OF SEVERE HEMORRHAGE.

1. Keep up the uterine contraction by hand or pad, and if there be any tendency to relaxation, by ergot or uterine injections.
2. Carefully prevent the patient from moving, raising her head, or using any muscular exertion.
3. Keep her cool, quiet, and perfectly free from all excitement.

4. If she be restless and irritable exhibit opium, so as to act as a general sedative.

5. Employ cordials and stimulants if her state of exhaustion require them.

6. Watch her sedulously for hours, and ascertain at intervals if there is any recurrence of hemorrhage.

INDUCTION OF PREMATURE LABOUR.

Nature of the Cases requiring the Operation.

1. When the bony pelvis measures from $2\frac{1}{2}$ to 3 or $3\frac{1}{4}$ inches in one diameter.

2. When dangerous maternal affections are present, as cardiac disease, ascites, etc., aggravated by pregnancy.

3. When dangerous disease arises during pregnancy and is aggravated by it, as

   (1.) Severe and intractable vomiting, especially in the latter months.

   (2.) Albuminuria and its consequences, both with first and with other children.

   (3.) Various acute inflammations, and other diseases?

4. When the infant is habitually too large—

   (1.) From recurrent prolonged pregnancy.

   (2.) From recurrent hydrocephalus.

5. When the infant is liable to die in the last months—

   (1.) From placental disease.

   (2.) From other causes.

6. In cases of fibrous tumours of the body of the uterus encroaching on the pelvis.

7. In some tumours of the ovary and soft parts.

8. At four or five months, when the pelvis is too small to pass a viable child.

Advantages of the Operation as facilitating Delivery.

1. The small size of the fœtal head.

2. Its greater compressibility.

Means of Operating.

1. Abdominal frictions and compression.
2. Ergot of rye.
3. Rupture of the membranes—directly or obliquely.
4. Separation of the membranes from around the os uteri.
5. Dilatation of the os uteri by sponge tents or elastic bags.
6. Dilatation of the vagina by sponge or bag.
7. Injection of warm water—
   (1.) Into the vagina.
   (2.) Into the uterus.
8. Injection of carbonic acid or common air.
9. Separation of the ovum from the interior of the uterus by the uterine sound or by a bougie.
10. Insertion of a long gum-elastic catheter between the membranes and the middle of the uterus.

General Rules and Cautions.

1. Assure yourself well of the necessity for the operation—
   (1.) By pelvimeters (?) or by measuring with the fingers.
   (2.) From the results of previous labours.
   (3.) By a consultation if there be any doubt whatever.
2. Be careful in calculating the proper period of pregnancy.
3. Prepare the patient by purgatives, medicated pessaries, etc.
4. Watch her diligently from the time of the operation till the labour.
5. Promote the facility, and if necessary the rapidity of the labour, by supporting the os uteri from the time of the rupture of the membranes till the head passes through it, and by dilatation of the os uteri if required.
6. Use long forceps when necessary, and in transverse presentations turn.

7. Have a warm bath and other means for resuscitating the child at hand.

8. Previously secure a wet nurse.

PUERPERAL STATE AND DISEASE.

GENERAL PHENOMENA OF THE PUERPERAL STATE.

1. Temporary collapse and exhaustion.
2. Reaction.
3. Contraction and involution of the uterus and vagina.
4. Uterine discharge—The lochia.
5. Mammary secretion.

GENERAL MANAGEMENT OF THE PUERPERAL STATE.

Enforcement for a time of the supine position, of abstinence from muscular exertion, and of quietude.

Ascertaining the state of the pulse, of the uterus, of the vagina, and of the uterine discharges.

The use of napkins and of a binder.

Attention to diet, drink, temperature, ventilation, bowels, bladder, lochia, and breasts.

MORBID DEVIATIONS DURING THE PUERPERAL STATE.

A. IN THE STATE OF THE UTERUS.

I. After Pains—Hysteralgia.

Treatment.

Remove the cause—as clots or membranes in the uterus or vagina, or the state of the rectum or bladder. Give a sedative.

II. Morbid Variations in the Rapidity of Involution.

1. Subinvolution.
2. Superinvolution.

III. Morbid Conditions of the Lochia.

(I.) SUPPRESSION.

1. Mechanical, as from clots in the os uteri.
2. The effect of constitutional disturbances.

Treatment.

According to the cause, as the use of hot fomentations, purgatives, antimony, etc.

(II.) PROFUSE FLOW.

Treatment.

Induce sufficient contraction of the uterus. Use astringents, as ergot, gallic acid, or acetate of lead; and in chronic cases tonics and external counter-irritation.

(III.) MORBID QUALITY.

Treatment.

Use disinfecting vaginal or uterine injections, as permanganate of potash, chloride of zinc, or chloride of lime.

B. IN THE STATE OF THE BLADDER.

I. Retention of Urine.

Treatment.

A warm sponge or cloth to the pudenda, or a cold cloth or hand to the abdomen, or the use of spirits of nitric ether. Use the catheter if necessary.

II. Incontinence of Urine.

Make sure that it is not a case of retention and overflowing, nor one of vesico-vaginal fistula.

C. INFLAMMATION OF THE VAGINA.

Treatment.

1. Use fomentations.
2. Give opium and ipecacuan if there be much pain.
3. Give antimony if there be much fever.

D. FEBRILE DISEASES OF THE PUERPERAL STATE.

I. Rigors.

Treatment.

Check them by diffusible stimulants.

II. Milk Fever.

Diagnosis.

1. The mammæ are distended.
2. There is headache.

Treatment.

1. Preventative by attention to the breasts, etc.
2. Curative by the same means, administering a smart purgative, giving febrifuge medicines, and applying leeches if necessary.

III. Ephemeral Fever or Weid.

Symptoms.

Those of a quotidian intermittent fever, presenting three stages : chill, dry heat, and perspiration.

Treatment.

1. Diminish the violence and duration of each stage.
2. Keep up the perspiratory stage till the headache is removed.
3. Beware of cold in bringing the patient out of that stage.
4. Endeavour to prevent return by providing against the ex-

citing causes, as gastric or intestinal irritation, exposure to cold, etc.

5. Give anti-periodics, as quinine, in the intervals, if the paroxysms recur.

6. Attempt to suspend the paroxysm in the first stage by diffusible stimulants, etc.

IV. Puerperal Fever.

Forms.

1. Simple inflammatory.
2. Bilious or gastro-enteric.
3. Typhoid or adynamic.

Symptoms.

Rigors—in about half the cases.

Abdominal pain—sometimes none. It varies in its seat, character, and intensity in different cases.

Frontal headache—often absent.

Rapid pulse—usually 110 to 140. A constant phenomenon.

Great diminution or arrest of lactation, and flabbiness of the mammæ—a most important symptom.

Diminution, arrest, or fetor of the lochial discharge. The state of the lochia varies in different epidemics.

Disorders of the tongue, stomach, and intestines—inconstant phenomena.

Delirium—occasionally.

Abdominal tympanites—common after the fever has lasted some time.

Hippocratic expression of face—in many cases.

Varying condition of the skin from hour to hour as to heat and moisture—in prolonged cases. The skin sometimes becomes of a yellowish hue.

Evidences of secondary affections of the chest, joints, and cellular tissue—if the case last some days.

Treatment.

Prophylactic—

1. Preparatory dieting, medicine, etc. Use of quinine, arsenic, perchloride of iron, etc?
2. Best possible air and ventilation.
3. Avoidance of contagion, and of inoculation. Use of chloride of lime, cyanide of potassium, etc., to disinfect the accoucheur's fingers.

Curative—

1. Venesection??
2. Leeches.
3. Fomentations.
4. Rapid counter-irritation—as by turpentine or blisters.
5. Enemata or purgatives.
6. Opium with calomel.
7. Ipecacuanha or tartrate of antimony.
8. Turpentine internally.
9. Colchicum.
10. Veratrum viride.
11. Digitalis.
12. Stimulants and tonics.
13. Washing out the uterus when the discharges are fetid.

Adapt the remedies to individual cases and epidemics. Give emetics, purgatives, sudorifics, diuretics, etc., according to the indication of nature.

PART II.

PREGNANCY.

DURATION OF HUMAN PREGNANCY;

ITS FREQUENT IRREGULARITY AND OCCASIONAL PROTRACTION.[1]

"I HAVE never," declared Sir Charles Clarke, "yet seen a single instance in which the laws of nature have been changed, believing the law of nature to be, that parturition should take place *forty weeks* after conception."

The preceding statement was made by Sir Charles Clarke when giving his evidence on the famous Gardner peerage case, before the House of Lords, in 1816.

On the same occasion, four other London medical practitioners—viz. Dr. Gooch, Professor Davis, Dr. Blegborough, and Mr. Pennington—averred it was their belief that women never passed the normal period of pregnancy; or, at least, never passed it beyond two or three days at the utmost. These various witnesses, however, against the protraction of pregnancy beyond its normal period, were by no means agreed among themselves as to what the normal period of pregnancy actually was. For, while Sir Charles Clarke stated it as forty weeks, that is, 280 days, or ten lunar months, or nine calendar months and a week—on the other hand, Dr. Gooch observed, in relation to the period of pregnancy, that "its normal duration is nine calendar months, or rather less than nine calendar months," or from 273 to 275 days. "It is," he observed, "generally stated in the books to be forty weeks, but I believe forty weeks to exceed the usual term of pregnancy. The writers," Dr. Gooch added, "say nine calendar months or forty weeks; now the fact is, that nine calendar months is scarcely more than thirty-nine weeks." Dr. Blegborough declared it as his opinion, that "the period of gestation is thirty-

[1] See *Edinburgh Monthly Journal of Medical Science*, July 1853, p. 50.

nine weeks or 273 days; but," he adds, "forty weeks I consider as the ultimatum."[1]

While these gentlemen thus varied as to what they considered the normal period of pregnancy—some stating that period to be thirty-nine weeks, others forty weeks—all of them agreed, to quote again Sir Charles Clarke, that "forty weeks is the *ultimum tempus pariendi mulieribus constitutum.*" Some physicians of the present day still hold that the law of nature is quite fixed in this respect, and that human pregnancy never exceeds the term in question. We have now, I believe, however, sufficient physiological and obstetric evidence accumulated to prove—1. That this doctrine regarding the ultimate length of gestation is incorrect; 2. That the term of human pregnancy is not, as a general law, so very definite and precise as many practitioners think it to be; and 3. That deviations from it, both in the way of diminution and of excess of time, are perhaps far more common than is generally supposed among the members of the profession at large. On the present occasion, I leave out of view the subject of abridged or shortened gestation; and I will chiefly confine my remarks to the much more vexed and debateable question of its occasional prolongation or protraction.

Most practitioners, from time to time, meet with cases in which there is apparently every reason to believe, that the term of pregnancy has exceeded the usual normal duration of 274 to 280 days. During the course of the last year or two, after setting aside some less remarkable instances, I have taken notes of two or three cases in my practice, in which, after making the common calculation of 280 days, or nine months and a week from the cessation of the catamenial discharge, pregnancy exceeded this period by several weeks, keeping the patients and their friends in a state of anxious waiting; and in all of the instances inflicting the unnecessary, as it proved, presence of a nurse in the house for a considerable time before labour actually occurred. The obstetric history of the first of these cases is interesting in more than this one respect.

Case I.—This patient was married in September 1845, and was supposed by her medical attendant to be pregnant in the earlier months of 1846. The case, however, proved one of that common affection, "spurious pregnancy;" and the catamenia, after being eight months obstructed, returned regularly. I first saw her in the course of the following year, in consequence of her suffering under leucorrhœa, and symptoms of chronic inflammation of the cervix uteri. The

[1] See Lyall's Medical Evidence in the Gardner peerage case, pp. 4-9, etc.

cervix uteri was enlarged and ulcerated, and the fundus greatly anteverted. The uterine inflammatory symptoms yielded under appropriate treatment; but the anteversion remained. In July 1848, an intra-uterine pessary was introduced with the view of rectifying this displacement. The instrument remained in the uterine cavity till the end of October following. Immediately after its removal, pregnancy occurred, and she was delivered of a daughter in July 1849, the labour being rendered very severe and tedious, by extreme rigidity of the tissues of the cervix uteri. From this cause the patient was, during parturition, fourteen hours continuously under chloroform. It was in her next or second pregnancy, that there was the apparent prolongation of utero-gestation. In the first week of January 1851, the menses were present, and disappeared on the 4th or 5th of the month. On the 20th of the same month, January, there occurred a return of menstrual discharge for six days, in consequence of great mental distress at the death of a favourite brother. No menstrual discharge appeared from this date, and she was confined on the 28th of December, that is, 336 days after the last appearance of the catamenia. From the patient wishing to go abroad, I was asked to ascertain if she were in the family way, towards the end of April. In consequence of the size and shape of the uterus, etc., I had no hesitation in concluding at the time, that she was then at least two months advanced in pregnancy; and I calculated for her that she would be confined about the middle of November. Parturition, however, as I have already stated, did not occur till the 28th of December.

Case II.—Mrs. ————, the mother of two children, and always quite regular in her catamenial periods, except when pregnant and nursing, began to menstruate about the 20th of September 1851, and the discharge ceased on the 24th. Shortly after this date, she had feverish symptoms, and from the catamenia not returning, she considered herself pregnant. She was not delivered, however, till August 3d, that is, 332 days from the last day on which the catamenial discharge appeared.

This lady's case was interesting in another point of view. In the middle of December, while in London, in consequence of a long walk, she was threatened with symptoms of miscarriage, requiring rest and treatment. On the 3d, or rather morning of the 4th of January, a large steamer in which she was, caught fire when two or three days out at sea, and only a small number of the passengers and crew escaped. After making almost superhuman exertions to save herself and a young son seventeen months old, whom she held in her arms, and after having her body severely bruised and contused, she was exposed for seventeen hours in an open boat, with little or no clothing, and sitting immersed several inches deep in water, during the whole of that long and anxious period. Yet, all the fearful mental excitement and bodily exertion to which she was thus subjected were accompanied by no tendency to miscarriage, though, as I have already said, two or three weeks previously a long walk had nearly brought on abortion. Could the protracted mental agitation and trial have in any way led to the unusual prolongation of her pregnancy?

Case III.—A patient had the usual menstrual discharge in March 1852, and it left her on the 23d day of that month. She was not delivered till the 5th of February 1853, or till 319 days after the last appearance of the catamenia. That the patient became pregnant very shortly, if not immediately, after her last menstruation, I have every ground for believing; for, in May, I was asked to see her before she left Edinburgh for the country, in order to determine whether the obstruction which had occurred was the result of pregnancy or not, as various

arrangements depended upon this. On examination, I found the uterus so enlarged, as to leave no doubt whatever that she was then about two months pregnant. The patient was, like myself, distrustful of the obstructed menstruation being a sufficient test, from one point in her previous history. She had been married several years, and without any family, when she first came under my care. The uterus was retroflexed, and for this she wore for some time an intra-uterine pessary. Within the first half-year after its removal, menstruation was absent for three months, and she had various symptoms of pregnancy; among others, the areolæ became dark, and their glandulæ enlarged. The uterus, however, did not increase in size—showing the symptoms to be those merely of spurious pregnancy. The areolæ were altogether so dark and marked, that a drawing of them was made about the third month. These sketches presented all the usual changes as distinctly as those figured by my friend Dr. Montgomery in his plate of the true areola at that period—and being preserved, they were found on comparison as marked as the patient's own breasts were at the same date a short time subsequently, when actual pregnancy had supervened. The prolonged pregnancy mentioned above occurred with this lady's fourth child.

When lately conversing with my friend Dr. Young, upon the possible prolongation of pregnancy, he stated to me a case which some time ago had occurred in his own practice; and of which the following is a note of the date and circumstances:—

Case IV.—The patient was always regular in her menstrual life, and had the catamenia present from the 9th to the 14th of July. This was the last appearance of the menses. She felt sickness towards the end of the same month, which continued more or less for four months, or till the end of November. Fœtal movements were distinctly felt on the 17th of November. She was delivered on the 3d of June, or in ten months and eighteen days; being 324 days after the last appearance of the catamenial discharge, and six months and sixteen days, or 198 days, after the first symptoms of quickening.

In the preceding cases, the durations of pregnancy, as calculated from the date of the last appearance of the last menstruation up to the date of delivery, were respectively 336, 332, 319, and 324 days. But, of course, it does not necessarily follow that the pregnancy in these instances actually extended to the preceding durations. For, it may be objected that none of the patients became pregnant till immediately before the return of the next menstrual period; or, on an average, till twenty-three days later than the date of the day of the last catamenial discharge. Even, however, if, for this reason, we thus subtract twenty-three days from each of these cases, the duration of gestation would still considerably exceed the normal limits; for twenty-three days thus subtracted from the first case would still leave a pregnancy of the duration of 313 days; from the second case, of 309 days; from the third, of 296 days; and from the fourth, of 301 days. Or the cases would stand thus:—

Case I.	No. of Days from last Menstruation		.	336 – 23 = 313
II.	,,	,,	,,	. 332 – 23 = 309
III.	,,	,,	,,	. 319 – 23 = 296
IV.	,,	,,	,,	. 324 – 23 = 301

There is another and greater source of fallacy to which such observations are liable, viz. that the catamenia are sometimes arrested from other causes than impregnation, for a month or two before conception actually occurs ; and that hence, if we date the duration of gestation from the last appearance of the catamenia, we may fall into a serious error of calculation. I have specially recorded Cases I. and III., because in these instances where gestation happened to be so much prolonged, this source of error was fortuitously avoided ; in both, the actual existence of pregnancy having been ascertained within eight or nine weeks after conception, by the most certain of all tests at that time, viz. the regularly marked enlargement and altered shape of the uterus.[1]

Three authors—Dr. Merriman, Dr. Murphy, and Dr. Reid—have each published a long series of observations from their own practice, to show the date of delivery as calculated from the last day of the catamenial discharge. Dr. Merriman gives as data for making this calculation the dates of the birth of 114 mature children, calculated from the day on which the catamenia were last distinguishable, but not including that day.[2] Dr. Murphy's analogous cases amount to 168 ;[3] and Dr. Reid's to 500.[4] In the following table I have attempted to bring into a comparative view the results obtained by these three physicians in the 782 cases upon which their observations are founded. The table shows, in divisions of weekly periods, the date of delivery of these 782 patients, as calcu-

[1] It has sometimes seemed to me also not improbable, that some cases of apparently prolonged gestation can be accounted for by another explanation. All our latest and best anatomists seem now to agree that the decidua of impregnation is merely an altered and hypertrophied state of the mucous membrane of the cavity of the uterus ; and that, consequently, the decidua is not at first a shut sac, but has the orifices of the Fallopian tubes and os uteri for a time opening into it. And it seems not entirely impossible that the ovulum of one impregnation dying without the decidua being immediately cast off, the cavity of the decidua—or, in other words, of the uterus—remaining permeable, a second impregnation may possibly take place within a short time, and the decidua of the first impregnation serve as the decidua of the second conception. If ever such an occurrence takes place, a catamenial period might be passed without any catamenial discharge—and hence an unavoidable error in calculation be fallen into.

[2] *Medico-Chir. Trans.* vol. xiii. p. 340.

[3] *Report of the Obstetric Practice of University College Hospital*, p. 9.

[4] *Lancet* for July 20, 1850, p. 81.

lated from the last day of the appearance of the last catamenial discharge in each individual:—

TABLE I.

Dates of Delivery, calculated from last Day of Catamenia.

Weeks.	Days.	Merriman.	Murphy.	Reid.
37th	From 252d to 259th	3	12	23
38th	... 260th to 265th	13	14	48
39th	... 267th to 273d	14	27	81
40th	... 274th to 280th	33	28	131
41st	... 281st to 287th	22	39	112
42d	... 288th to 294th	15	21	63
43d	... 295th to 301st	10	25	28
44th and upwards.	... 302d to 326th	4	2	14
		114	168	500

The result of the preceding observations of Dr. Merriman, Dr. Murphy, and Dr. Reid, may, perhaps, however, be shown still more accurately by reducing the facts mentioned by them into another form, and calculating the weekly percentage of deliveries from the last day of the catamenial discharge, as brought out in the observations of each of these authors. The following table is intended to give this view of the subject:—

TABLE II.

Percentage of Weekly Deliveries from last Day of Catamenia.

Weeks.	Days.	Merriman.	Murphy.	Reid.
37th	From 252d to 259th	2.65	7.14	4.60
38th	... 260th to 266th	11.40	8.33	9.60
39th	... 267th to 273d	12.28	16.07	16.20
40th	... 274th to 280th	29.00	16.66	26.20
41st	... 281st to 287th	19.30	23.21	22.40
42d	... 288th to 294th	13.16	12.50	12.60
43d	... 295th to 301st	8.77	14.86	5.60
44th and upwards.	... 302d to 324th	3.50	1.20	2.80
		100.	100.	100.

The preceding facts show, that if we take as the starting-point or commencement of our calculations regarding the duration of pregnancy, the last day of the last catamenia, the date of delivery is far less decided and determinate than is generally believed by the medical profession; the cases registered in these tables showing very great irregularities and deviations in this respect. It is further

deserving of especial remark, that a large proportion of all the cases, from 12 to 16 per cent, terminated as early as during the course of the 39th week, or from 267 to 273 days after the last day of the last menstruation. On any one individual day, only a small proportion of deliveries occurred. The largest actual number of mothers delivered on individual days was in Dr. Murphy's series of 186 cases, 10, or 6 in every 100, on the 285th day after menstruation; 7 on the 273d, 279th, and 283d days; and 6 on the 270th, 278th, 284th, 287th, and 297th days after the same date. In Dr. Reid's series of 500 cases, the greatest number of mothers delivered on individual days was 25, or 5 per cent, on the 282d day after the last catamenia; 22 on the 278th day; and 21 on the 274th and 279th, etc. Out of Dr. Merriman's 114 cases, 9 were delivered on the 280th day; 8 on the 277th; 6 on the 283d; 5 on the 281st and 288th day; 4 on the 264th, 274th, 285th, 298th, etc.

One circumstance accounting, no doubt, for much of the apparent irregularity or instability in the duration of pregnancy, as shown in the above tables, in the cases prolonged to the 40th week, or beyond it, is the fact, that though impregnation usually takes place within a very few days after the last catamenial discharge, it may not necessarily do so. For conception may in fact occur at any date previous to the recurrence of the next menstrual period. This gives an uncertain limit for the actual date of impregnation, of twenty-two or twenty-three days—the average interval between two menstrual periods. But the possibility of variation from this circumstance will by no means account for the great amount of variation in gestation which is so frequently observed. For there has now been recorded a long comparative series of observations upon the duration of pregnancy among our domestic animals, and particularly upon the cow, in which these sources of variation and fallacy with regard to the length of gestation, were avoided by the fact that the exact day and date of impregnation in these experiments, from a single intercourse with the male, were in each instance accurately noted and fixed. Thus Lord Spencer has reported the date of delivery in 754 cows, in which the day of impregnation from a single coitus with the bull had been carefully registered.[1] M. Tessier had previously published 572 observations of a similar kind upon the same animal.[2] If we omit a number of cases in each of these two series of observations, in which delivery supervened earlier than the thirty-seventh week, we

[1] *Journal of the English Agricultural Society*, Part ii., 1839.

[2] *Mémoires de l'Académie Royale des Sciences*, 1819, Tom. ii. p. 1.

have the result of Lord Spencer's and M. Tessier's observations presented in the following table—

TABLE III.

Periods of Gestation in Cows.

Weeks.	Days.	Spencer.	Tessier.
37th	From 252d to 259th	12	6
38th	... 260th to 266th	4	8
39th	... 267th to 273d	24	51
40th	... 274th to 280th	121	166
41st	... 281st to 287th	392	202
42d	... 288th to 294th	175	105
43d	... 295th to 301st	16	27
44th and upwards	... 302d to 321st	7	7
		751	572

This table shows that in the cow, even when the day of impregnation was fixed and ascertained, the period of delivery was still very far indeed from being quite stable and determinate.

But to make the comparisons between these observations on the cow, and those reported above on the human subject, more complete, let us reduce the experiments on the gestation of the cow to a percentage form, as we have already done in Table II., in relation to the cases in the human subject, recorded by Drs. Merriman, Murphy, and Reid. The following table shows the actual proportion of weekly deliveries in Lord Spencer's and M. Tessier's observations on the cow, as calculated from the known date of impregnation of the animal; or, in other words, the proportion of cases in every 100 in which the gestation was normal, abridged, or prolonged:—

TABLE IV.

Percentage of Different Periods of Gestation in Cows.

Weeks.	Days.	Spencer.	Tessier.
37th	From 252d to 259th	1.60	1.05
38th	... 260th to 266th	0.55	1.40
39th	... 267th to 273d	2.80	8.91
40th	... 274th to 280th	16.53	29.02
41st	... 281st to 287th	52.27	35.31
42d	... 288th to 294th	23.18	18.36
43d	... 293d to 301st	2.12	4.72
44th and upwards	... 302d to 321st	0.93	1.22

In making any comparison between the results of the period of gestation in the cow, as shown in Table IV., and the period of gestation in the human female, as shown in Table II., it is necessary to remember, that, while the normal period of gestation in the human female is probably from 274 or 280 days, that of the cow extends, according to Lord Spencer, to 284 or 285 days. And hence, while we find that the largest percentage of deliveries in the cow takes place from the 281st to the 287th day of gestation, the largest percentage of deliveries in the human female, as calculated even from the last day of the catamenial discharge, occurred in Dr. Merriman's and in Dr. Reid's observations from the 274th to the 280th day; though in Dr. Murphy's series of cases, his largest weekly percentage occurred in the week following the 280th day from the last catamenia—an occurrence probably to be explained by the circumstance of impregnation not following till two, three, or more days after the last menstruation.

Amongst the various observations which might be elicited by a comparison of these tables, let me state one more :—That though the period of gestation in the cow is found liable to considerable variations, and is by no means so precise and determined as many authorities have supposed it to be, yet the period of pregnancy in the human mother is not even so regular as the period of gestation in the cow. This greater apparent variation of the duration of pregnancy in the human subject in these tables, doubtless depends upon the fact already adverted to, that the last day of the catamenia does not by any means, in the human mother, fix determinately the actual day of conception.

Occasionally, however, in the human mother, pregnancy occurs under circumstances which fix the date of conception to a precise day. Dr. Reid, for example, has collected from the observations of various authors, and from his own practice, the history of forty cases in the human female, where impregnation was the result of a single intercourse, the date of which was accurately known; the cases being all of them "instances of single women who dated from one coitus, or of married females whose husbands had been absent for a considerable time before the last intercourse," and all of them being selected with a view to avoid as far as possible every source of deception. Below I have thrown these forty cases of gestation into a tabular form. This table demonstrates the varying duration of pregnancy, and consequently the variable date of parturition and delivery in the human female, even when the date of impregnation is

previously accurately established and known. The last column in the table presents in the percentage form, so far as can be calculated from so small a number, the relative proportion delivered at different dates from the day on which conception occurred.

TABLE V.

Periods of Forty Deliveries in Human Mothers—Impregnation being calculated from a single Intercourse.

Weeks.	Days.	Total Number of Cases.	Percentage.
38th	From 260th to 266th	5	12.50
39th	„ 267th to 273d	7	17.50
40th	„ 274th to 280th	18	45.00
41st	„ 281st to 287th	6	15.00
42d	„ 288th to 294th	4	10.00

This table shows that in the human subject, and with the day of impregnation known, pregnancy in nearly one-half, or in 45 per cent, extended from 274 to 280 days; that in 15 per cent it was protracted from the 281st to the 287th day; and in 10 per cent[1] it was prolonged from the 288th to the 294th day. Three only out of these 40 cases, or 1 in 13, were delivered on the 280th day after conception. Seven, or 1 in 6, were delivered on the 274th day.

Admitting then the possibility of the occasional protraction of human gestation beyond its common normal period, another question has sometimes been asked, viz. What is the extreme limit of this protraction, or, in other words, to how many days beyond the normal period of gestation is it *possible* for a woman to carry a child? I confess that some of the late cases recorded, particularly by our American brethren, appear to me to be beyond the bounds of this possibility. Thus, Dr. Meigs of Philadelphia has reported a case on "facts" which he conceives to be "trustworthy," where a patient supposed herself pregnant in July 1839, quickened on the 20th of November, had spurious labour pains on the 10th of April, but her child was not born till "the 13th of September 1840, about daylight;" the pregnancy thus, according to Dr. Meigs, having "endured nearly fourteen months or 420 days."[2]

[1] Perhaps this proportion is made larger than it should be, by some of the published cases which Dr. Reid has collated having been possibly recorded merely because they were marked instances of protraction.

[2] *Obstetrics, the Science and the Art*, 1852, p. 230.

Professor Atlee of Philadelphia has published two cases of protracted gestation occurring under his own observation. In the first of these, the patient lost her catamenia on March 22d, 1832—quickened August 5th of the same year—and was delivered with forceps March 22d, 1833. It was her fourth pregnancy. In Dr. Atlee's second case, the patient saw appearance of menstruation for the last time on August 6th, 1832—quickened on December 25th—but was not delivered till August 13th, 1833. Dr. Atlee, who states that he has not "the least doubt of the truthfulness of the evidence in the above cases," imagines, from the date of the quickening in each, that both mothers became pregnant shortly after their last catamenial periods, and that consequently, in both instances, the patient went pregnant nearly the entire circle of the calendar, or 365 days.[1]

Without stopping to inquire as to the various sources of fallacy in these and similar observations, let me merely add, that I believe our best criterion for fixing the "legal limit," or ultimate possible period of gestation in the human female, will be derived from careful and repeated observations upon the ultimate period of gestation in the cow; allowing always for the difference of four or five days of excess in the normal period of pregnancy in the cow, as compared with the human mother. Lord Spencer, in one instance, found the period of gestation in the cow to extend to 313 days from the date of impregnation; and in one of his observations on the same animal, M. Tessier states, that parturition did not supervene till 321 days from the date of conception.

Such direct experiments and observations upon the lower animals afford evidence, which necessarily, I think, forces us to admit, that in exceptional cases in the cow—and hence also, as

[1] Tucker's *Elements of Midwifery*, p. 149.—Dr. Tucker records at some length the opinion of the American Court regarding the possible protraction of pregnancy, as elicited at a trial for bastardy at the Lancaster Quarter Session. In this case the prosecutrix swore that her child was begotten on the 23d of March 1845, and was born on the 30th of January 1846—making the period of gestation 313 days—or two days longer than the alleged term of gestation, 311 days, in the Gardner peerage case. In the American trial, six medical practitioners testified, with more or less positiveness, against the possibility of the protraction of pregnancy. On the other side, five medical practitioners declared their belief in the occasional extension of gestation beyond the normal period, and in the possibility of its protraction to 313 days. In charging the jury, the President of the Court held, that protracted gestation for a period of 313 days, "although unusual and improbable, was not impossible;" and in accordance with this charge the jury found the defendant guilty.

we certainly may fairly infer, in the human female—the period of gestation may be prolonged 30 or 35 days beyond its normal and usual duration. And it is not impossible that further accurate and repeated experiments, of the nature of those performed by Lord Spencer and M. Tessier, may yet establish, by the same kind of proof, even a more extended limit as the *ultimum tempus pariendi.*

Those obstetricians who maintain that the period of human gestation is a fixed period, and can never by any possibility exceed the fortieth week (as was sworn to by the five London accoucheurs who gave evidence in the Gardner peerage cause, and by the six medical practitioners who more lately gave similar evidence in an analogous cause before the American Court at Lancaster[1]) have none of them adduced any reason why the period of pregnancy should be thus stable and invariable, while all other periodic processes in the human body—as dentition, puberty, menstruation, the date of quickening, etc., are universally known and acknowledged to be apt to vary extremely. These obstetricians have offered no reasons, so far as I know, for holding that similar variations could not take place in the duration of pregnancy. Indeed, it would be against all analogies from other actions and processes in the animal kingdom to suppose that such variations did not occur in regard to the function of gestation.

Cases of protraction of utero-gestation beyond the usual average period have been attempted to be accounted for by some physiologists, by tardiness in the escape of the ovulum from the ovary after impregnation, by delay in its transit through the Fallopian tube, and by other deviations in time connected with the earlier history of development. These explanations, however, are at the best mere assumptions and hypotheses. There are, however, one or two known circumstances which seem to have an occasional, though not very marked, influence on the prolongation of pregnancy.

In the individual cases of protraction which I have detailed towards the commencement of the present communication, the protraction was limited to individual pregnancies in the mothers. With other children, these mothers had not exceeded the normal term. Occasionally, however, a disposition to prolongation appears to be peculiar to some mothers in *all* their pregnancies. Dr. Dewees states, that he had occasion to observe the anormal pro-

[1] See preceding footnote from Dr. Tucker's work.

longation of pregnancy to upwards of ten calendar months, or above 300 days, as an habitual arrangement in at least four females whom he had attended.[1] Dr. Hamilton has recorded the protraction of pregnancy as a marked individual peculiarity in one of his patients. In this case the lady lost her two first children from what was supposed to be prolonged gestation to the eleventh menstrual period. In her three next pregnancies Dr. Hamilton induced labour with success a week after the tenth menstrual period ; in all of these pregnancies, the patient seeming to show the same tendency to the prolongation of gestation.[2] My friend, Professor Retzius of Stockholm, has informed me of a still more strange example that has occurred in his practice of extreme protraction of pregnancy, not as a peculiarity in an individual mother, nor as attending individual pregnancies only, but as an hereditary peculiarity in a mother and her two daughters.

It is a common idea among agriculturists in this country, that pregnancy is more apt to be protracted in cows, etc., in proportion to the frequency of their previous pregnancies. I am not aware of any collected facts calculated to prove or disprove this idea. The sex of the calf is also very usually supposed by farmers to have some influence upon the duration of pregnancy—cows when they pass beyond the normal period being averred to produce more frequently a male than a female calf. In Lord Spencer's experiments —if we omit the cases of twin births—among all the cows delivered up to the 284th day after impregnation, there were 53 per cent of female, and 47 per cent of male calves born ; while among 381 cows whose period of gestation lasted from 285 to 313 days, as many as 61 per cent of the calves produced were males, and only 39 per cent females. In the table which Dr. Murphy has published of the duration of pregnancy in 184 human females, the sex of the child is stated in each with a few exceptions. I find that out of 90 cases noted in which the mothers were not delivered till upwards of 280 days after menstruation, 57 per cent of the children born were boys, and 43 per cent were girls.

Perhaps the state of health and activity of the uterus as an individual organ of the body, may sometimes have the effect of leading on to prolongation of gestation. In two of the cases, viz. Cases I. and III., which I have detailed, it is not impossible that this condition may have been the cause of the protraction.

The cause why parturition generally comes on in the human

[1] *Compendium of Midwifery*, p. 465. [2] *Practical Observations*, p. 106.

female from the 274th to the 280th day has been much debated among physiologists and accoucheurs; and perhaps a knowledge of it may be necessary before we can understand all the circumstances which lead to the frequent irregularities and occasional prolongation of pregnancy. All the explanations which, so far as I know, have been hitherto offered on this subject, such as those that refer the excitation or supervention of labour to the development of the body of the uterus, to the state of the cervix, to the state of the ovary, to the state of the fœtus, etc., will, I believe, be found untenable. And I would venture to suggest that, in the human female, the exciting cause of parturition is to be traced to changes going on, or rather accomplished, between the uterus and its deciduous lining;—which changes lead to parturition, when they have proceeded so far as to effect the necessary amount of disintegration and separation between the relatively attached surfaces of the uterus and decidua. In these communications, I may take another opportunity of stating the different facts which seem to me to bear on this view of the question, and show more particularly the changes in the structure of the decidua—both *vera* and *serotina*, but especially the former—and in particular of its outer or attached surface, to which I allude. Let me, in the meantime, merely observe, that these changes, in the connection between the decidua and uterus, seem of a nature analogous to the so-called fatty degeneration, which occurs in effete and worn-out structures in other parts of the body; and that we artificially imitate these changes and their effects in inducing premature labour, when we separate the membranes from the interior of the uterus with the finger, or the sound, or when we inject water into the uterine cavity, etc. These changes of textural degeneration and detachment are not necessarily accomplished with precision to a certain fixed day; and hence, I believe, the very great irregularity which we have seen in the preceding tables to exist in relation to the time at which parturition supervenes after impregnation. In Lord Spencer's and M. Tessier's tables, we have evidence of the extreme irregularity of the period of utero-gestation, and the comparative frequency with which anormal protraction of gestation occurred in a series of experiments, which, it must be remembered, were limited to about 1300 cases only;—and when we call to mind, at the same time, that in Great Britain alone, some 600,000 cases of human gestation and parturition take place annually, we cannot avoid concluding, that irregularities and anormal protractions in human gestation might be found in obstetric practice far more frequently

than the profession generally suppose, provided the circumstances bearing upon this point were always duly and properly investigated.

NOTE ON THE THERAPEUTIC ACTION OF THE SALTS OF CERIUM,

IN THE VOMITING OF PREGNANCY, ETC.[1]

Chemists are at present acquainted with forty-nine different metals. Preparations, in the form of oxides and salts, from seventeen of these metals, are to be found in our British pharmacopœias. Most of the remaining thirty-two metals are of comparatively late discovery, and few, or almost none, have been tried medicinally. But, betimes, the oxides or salts of some, at least, of these newer metals will, in all probability, be found to possess therapeutic qualities as marked as the preparations, that have been so long used, of the older known metallic bodies.

In attempting to make some observations on the therapeutic character of the untried metals, I have been especially gratified by the results which I have found to be produced by the medicinal use of the salts of cerium.

This metal, cerium, or cererium, was first discovered in 1803, and almost simultaneously by Hisinger and Berzelius, and by Klaproth. It has been found by these and other chemists to exist in a variety of minerals, as the Edwardsite, Cerite, Euxenite, Gadolinite, etc. The Greenland Allanite is said to contain thirty-four per cent of cerium.

It is usually found in nature combined with two other metals, lanthanum, or lantanium, and didymium. In the complex process of separating the cerium from these two other metallic bodies, oxalic acid, or rather oxalate of ammonia, is employed in the last stage; and in the markets cerium is thus most readily procured in the form of an oxalate of the protoxide. In using cerium medicinally, I have generally employed the oxalate in the form of small pills, and in the dose of one to two grains, or a solution of the nitrate in water, and in the same proportionate doses.[2]

[1] See Proceedings of Medico-Chirurgical Society of Edinburgh, November 15, 1854, in *Edinburgh Monthly Journal of Medical Science*, December 1854, p. 564.

[2] For the last few years Sir James Simpson was in the habit of giving oxalate of cerium in doses three or four times larger than those stated in the text.—J. W. B.

The principal therapeutic action of the salts of cerium appears to me to be that of a useful sedative and tonic, or, if we may use such an expression, "sedative-tonic,"—like the pharmaceutical oxide and salts of silver and bismuth. I have employed it pretty extensively in the treatment of the class of cases described in the preceding paper, chronic intestinal eruptions, and occasionally with the most marked good effect in them, in instances that had resisted all other forms of treatment. It is often useful also in common cases of irritable dyspepsia, gastrodynia, etc. In my own practice and in that of others, I have seen the above preparations of cerium succeed in at once allaying irritable and obstinate vomiting after all other means had failed. Sometimes I have observed it fail, like all other remedies, in giving relief in the sickness and vomiting of pregnancy; but far more frequently I have found its employment accompanied by direct beneficial effects; and I have now repeatedly had occasion to see it both immediately and perfectly successful in some instances where the usual succession of medicines,—prussic acid, naphtha, opium, bismuth, ice, etc.,—had all been previously and perseveringly tried in vain.

INHALATION OF OIL OF JUNIPER AS A DIURETIC IN ALBUMINURIA.[1]

Professor Simpson said he might take this opportunity of mentioning a case he had lately seen with Dr. T. Balfour. The patient, very near her full time, suffered from œdema of the whole body, to a greater extent than he had ever seen before. Her mind was wandering. All diuretics, etc., had failed; and her stomach was so irritable that it was impossible to administer medicine in the ordinary way. Premature labour could not be induced on account of the excessive œdema of the labia. He recommended the inhalation of the oil of juniper. A profuse flow of urine soon followed, and the enormous œdema rapidly subsided. The medicine had soon to be stopped, to prevent too great irritation of the bladder. The patient was shortly after delivered of a dead child, and made a good recovery.

[1] See Proceedings of Edinburgh Obstetrical Society, April 27, 1864, in *Edinburgh Medical Journal*, August 1864, p. 178. See also *Edinburgh Medical Journal*, January 1864, p. 668.

INDUCTION OF ABORTION IN ALBUMINURIA.[1]

Dr. Simpson stated that he had been induced to bring on abortion in a case of pregnancy, on account of the presence of extreme dropsy and dyspnœa from albuminuria. The patient, who was apparently dying at the time, recovered speedily and entirely after the abortion.

TREATMENT OF HEMORRHAGE CONNECTED WITH ABORTION.[2]

Dr. Simpson offered some observations on the introduction of the sponge-tent into the os of the pregnant uterus, in certain conditions connected with abortion, as well as a means of inducing premature labour. When abortion was inevitable, and the hemorrhage great, a small expanding sponge-tent passed into the os uteri was, he stated, more effectual than a large vaginal plug. It at the same time opened up the os uteri, so as to allow of the more easy escape of the contents, whilst uterine contractions were, in most instances, ultimately induced by its presence. For the same reasons it was often a valuable means both of opening up the os uteri, and exciting the necessary degree of uterine action in those occasionally perplexing cases where, in abortion, the embryo escapes, but the secundines are long retained. He found that the tent, when made and introduced in the mode already stated, required no vaginal plug, or other means to hold it *in situ*. By its use the first stage of labour, or the dilatation of the os uteri, could, in a great degree, be advanced, before the labour itself actually began.

INDUCTION OF PREMATURE LABOUR FOR RECURRENT HYDROCEPHALUS IN THE FŒTUS.[3]

Professor Simpson said that he had brought on labour prematurely, about four years ago, in a case where he believed that he had met with a new indication for the performance of the opera-

[1] See Proceedings of Edinburgh Obstetrical Society, Session xiii., in *Edinburgh Medical Journal*, August 1855, p. 184.

[2] See Proceedings of Medico-Chirurgical Society of Edinburgh, July 3, 1844, in *London and Edinburgh Monthly Journal of Medical Science*, August 1844, p. 735.

[3] See Proceedings of Edinburgh Obstetrical Society, May 9, 1860, in *Edinburgh Medical Journal*, September 1861, p. 289.

tion. Mrs. L., the patient who was the subject of the operation, had fallen in labour of her first child in 1851. Her labour had lasted two days, and was terminated by the head of the child, which was in a hydrocephalic condition, being perforated by Dr. Jamieson of Peterhead. Her second labour, in 1853, was also terminated by means of the same operation, by Dr. Johnston of Stirling, because of the same morbid condition of the fœtal head. In 1856 he (Dr. S.) first saw the patient, in consultation with Dr. Johnston, at a time when she had arrived at the eighth month of her third pregnancy. There was every probability that in this instance again the child would become hydrocephalic, and be destroyed at birth; and the probability was increased by the circumstance that the only sister of the lady in question had given birth to but one child, which had likewise been hydrocephalic, and had been delivered by means of craniotomy. The likelihood of the recurrence of the disease in the third fœtus was still further impressed on his (Dr. Simpson's) mind, by a letter which he received about that time from Dr. Embleton of Embleton, in which that gentleman related how he had just delivered a woman of a child that presented by the breech, and was very difficult of extraction, because of the head being distended to twice the natural size from hydrocephalus. And Dr. Embleton had stated, further, that the first and third children of the same patient had been born hydrocephalic, and had been delivered by means of the forceps. Regarding it, therefore, as in the highest degree probable, in the case of Mrs. L., that if her third pregnancy were allowed to run its full course, her third child would become the subject of intra-uterine hydrocephalus like its predecessors, he (Dr. S.) had two reasons to lead him to induce premature labour at once; viz., 1st, it was a matter of great importance for the lady to have a *living* child, and there was little prospect of her hopes being fulfilled if her progeny were all born hydrocephalic; and, 2dly, it was fairly to be expected, that if the child could be brought into the world at once, and the conditions of its existence changed, it would have a better chance of escaping the dangers of the disease which had proved fatal to the first two children. The result justified his (Dr. S.'s) expectations. Labour was induced, and a living child was born, which he had seen a few weeks ago in the enjoyment of the most perfect health.

OBSERVATIONS ON THE INFLUENCE OF THE DEATH OF THE FŒTUS

IN RELATION TO ITS RETENTION IN, OR EXPULSION FROM, THE UTERUS.[1]

Dr. Simpson, in exhibiting some "secondary" fœtuses from the University Museum, stated the following general propositions regarding them. The general law which regulated the occurrence of labour in relation to the death of the fœtus was well known to be this :—

1. That usually, in from one to three weeks after the fœtus dies, uterine contractions supervene, and effect its expulsion. But to this very general law there are various exceptions. For—

2. If the embryo die in early embryonic life, and the fœtal appendages continue to live and vegetate, expulsion may not supervene for months. He showed a case of hydatiginous ovum, where the embryo was not larger than an embryo of the sixth week, but the placenta, or rather the chorion, was the seat of hydatiginous hypertrophy and degeneration ; and the mother, a patient of Mr. Girdwood's of Falkirk, calculated that she had passed the usual term of utero-gestation, not having menstruated for eleven months previously to the expulsion of this diseased ovum.

3. When the fœtus dies from the third month onwards, in consequence either of disease in its own organisation, in its umbilical cord, or in its placenta, and a second twin living fœtus exists at the same time in utero, and this second fœtus continues to grow and keeps up a correspondence of development between the organ and its contents, the dead and undeveloped twin may be retained up to the full term of pregnancy, and be then born along with the other living and full-sized child.

4. When the dead fœtus is thus retained, it is preserved free from the decomposition usually following death, by all access of air to it being prevented. Sometimes it retains its usual rounded appearance and form, if it continues to be surrounded by a sufficient quantity of liquor amnii ; but in other cases where this protecting

[1] See Proceedings of Edinburgh Obstetric Society, February 9, 1848, in *Edinburgh Monthly Journal of Medical Science*, May 1848, p. 836.

medium of liquor amnii is defective, the fœtus becomes gradually more and more squeezed between two forces, viz. the parietes of the uterus on one side of it, and the other living twin or its membranes on the opposite side; and at last, when born, it is found compressed and *flattened* in form. Two such flattened fœtuses are in the University Museum; and many such cases are on record.

5. The birth of such undeveloped dead twins has sometimes given rise to most groundless and erroneous ideas of the existence of superfœtation.

6. Occasionally when one of twins dies early in pregnancy, it is after a time expelled, when it happens to be situated near or over the os uteri; afterwards the uterus closes, and pregnancy goes on to the full time with the remaining living child. He mentioned the case of a lady aborting of a fœtus about the third month, going on in pregnancy to the full time, and then being delivered of twins; having originally conceived of triplets.

7. This last circumstance evidently led to the practical deduction—that when a dead fœtus in its envelopes is expelled during the currency of pregnancy, and the uterus notwithstanding still remains large and apparently distended, its further contents should not be in any way interfered with; but rest and other means employed to avert the excitement of any additional uterine contraction, under the hope that a living twin may still be retained, and be carried onwards to the full term of utero-gestation.

PART III.

THE FŒTUS AND ITS APPENDAGES.

ON THE EXCITATION OF FŒTAL MOVEMENTS BY COLD.[1]

It is very generally believed by accoucheurs that the sudden application of a cold hand, or other similar body, to the cutaneous surface of the abdomen of a woman advanced in utero-gestation, is capable of exciting movements on the part of the fœtus; and such application has been often recommended as one of the simplest and best means of ascertaining, in doubtful cases of pregnancy, both the existence and the vitality of the child.[2]

But as there is no direct organic communication between the abdominal walls of the mother and the body of the fœtus, or between the nervous system of the mother and that of the child in utero, the power of exciting muscular movements in the latter, by a sudden impression of cold upon any part of the abdominal maternal skin, seems, physiologically considered, an impossibility, and clinical observation and direct experiment seem to me to prove the whole idea to be fallacious.

If the hand, whether cold or hot, is so much pressed inwards, as it inadvertently often is, so as either to indent, or alter the shape of, the uterine walls, or to push and irritate the body of the fœtus, then fœtal movements will be liable to follow.

If, on the contrary, the hand, however cold, be applied so as merely to touch the skin, and not make pressure upon it and the uterus beneath, the impression of cold thus produced will never, I believe, be found to excite fœtal movements.

Such at least is the result of numerous clinical observations

[1] See Proceedings of Edinburgh Obstetrical Society, Session ix., in *Edinburgh Monthly Journal of Medical Science*, July 1850, p. 90.

[2] See, for example, Montgomery's *Exposition of the Signs of Pregnancy*, p. 89; Dr. Gooch on *Diseases of Women*, p. 203; Dr. A. Hamilton's *Letters to Dr. Osborne*, p. 147; Dr. J. Hamilton's *Practical Observations*, p. 151, etc. etc.

which I have tried to make upon the subject. In some direct experiments in regard to it, I touched the surface of the abdomen with metallic bodies, both larger and colder than the human hand, without exciting *any* movements in the fœtus. In a number of instances, with Dr. Weir, I applied large pieces of smooth ice to the surface of the abdomen, without in any one instance finding fœtal movements to follow. And yet, in these same cases, comparatively slight pressure with the hand upon the abdominal parietes and uterus, excited fœtal movements, whenever in any way the fœtus was irritated or displaced by that pressure.

PERITONITIS IN THE FŒTUS IN UTERO.[1]

In the recent progress of pathology it has been amply proved that the fœtus in utero is liable to a considerable variety of morbid states. Of its diseases, some, we have reason to believe, are altogether of a functional nature; but in regard to this class of fœtal affections we as yet possess comparatively little information, because, excluded as the fœtus is, during its abode in utero, from any of our present means of observation, it is only when its morbid derangements produce symptoms of a very aggravated character, that we are enabled to recognise their existence during the continuance of intra-uterine life. Indeed, for nearly all the limited knowledge which we as yet possess of the diseased conditions of the fœtal system, we are indebted principally, if not entirely, to pathological anatomy; and consequently the diseases of that system with which we are chiefly acquainted are either such as are organic in their nature, or that lead to an organic result.

Of all the various morbid actions which are liable to occur in the fœtus, *inflammation*, with the different pathological changes which it produces, seems to be one of the most important, both as regards the frequency of its occurrence, and the nature of the effects to which it gives rise. In the present communication, it is my intention to bring forward a series of cases to prove, that one species of inflammatory action, namely *peritonitis*, forms a common variety of fœtal disease, and probably constitutes one of the more frequent causes of death of the fœtus during the latter months of pregnancy.

It may be necessary, however, to premise, that the investigation, by pathological anatomy, of the presence and effects of inflammatory

[1] See *Edinburgh Medical and Surgical Journal*, October 1838, p. 390.

action, and indeed of all other morbid changes in the fœtus, is beset with unusual difficulties. When the fœtus labours under any morbid state which happens to prove fatal during its abode in utero, there generally elapses an interval of from five to twenty days before the uterine contractions, necessary for its expulsion, supervene. During this period a number of changes are liable to occur, which are calculated to mask or destroy the usual morbid appearances left by inflammation. Pathologists are now becoming fully aware that various injections, colorations, serous and sero-sanguinolent effusions and softenings of different tissues and organs, more or less perfectly resembling the corresponding alterations produced in the same parts by inflammation, are liable to be met with in the dead body of the adult, as the effects of merely chemical and physical causes acting during the latter hours of life, or after death. In the case of the dead fœtus retained in utero, we have not only the same causes producing the same results, but these results increased considerably in their degree and intensity by the longer period during which their causes are generally allowed to operate; and, besides, we have further to take into account the additional effects of the endosmosis of the liquor amnii, and of the blood and other fluids of the fœtus, through the dead tissues of its body, and the continued maceration of these tissues in the effused and transuded fluids in which they are placed. In consequence of the operation of these and other causes, we have constantly found, in our examinations of fœtuses that had died several days before birth, the heart and large blood-vessels almost entirely emptied of blood, the different serous cavities of the body filled by an abundant sero-sanguinolent fluid, and the same fluid often collected in the general course of the cellular tissue, but more particularly in that of the scalp, while at the same time the different solid tissues are reduced more or less in consistence, and altered in colour and physical appearance. We have seen tissues and membranes which, from the morbid secretions existing upon them, we knew to have been the seats of acute morbid action immediately previous to death, macerated and blanched, and sometimes variously discoloured from the imbibed bilious, intestinal, and other secretions; whilst, on the other hand, we have found other membranes and tissues of the body, that had in all probability not been the seat of any morbid state during life, more or less deeply reddened, injected, tumefied, and softened. Indeed, we had not been long engaged in this field of pathological inquiry, before we became fully convinced that we were not entitled to consider any

tissue or organ in the dead fœtus as having been the seat of inflammation during life, unless we could detect in that tissue or organ one or other of those characteristic morbid secretions, or more distinct permanent changes of structure, which are recognised as the distinctive organic results of inflammatory action, such as the deposition of coagulable lymph, and the indurations, thickenings, etc., to which this deposit gives rise, the effusion of more or less serous or sero-albuminous fluids, or of true purulent matter, ulceration, etc. Accordingly, in the details of the following cases, it will be observed that we have only entered as genuine examples of inflammation of the peritoneum, those instances in which there existed upon that membrane, or in its cavity, one or other of the organic products of inflammation to which we have just alluded; but more particularly, effused coagulable lymph, and the adhesions and pseudo-membranes which such lymph so readily produces, when thrown out upon serous surfaces.

CASES OF ACUTE PERITONITIS.

Case I.—On the morning of the 15th October 1836, my attendance was requested at the Lying-in Hospital in a case of twins. The first child had been born after a natural and easy labour. On examination, I found the second child presenting by the head, and labour pains having spontaneously recurred, it was expelled in about forty minutes after the birth of the first. The first-born child was living, healthy, and well formed. The second had apparently been dead for some days; its cuticle could be easily peeled off, and was raised into bullæ at various parts by a sero-sanguinolent effusion beneath it. Its body, however, was by no means emaciated, but as plump and fat as that of the first child.

Being unable to discover in the portion of the double placenta belonging to the second child any disease that could account for its death, I opened its body twelve hours after birth, in presence of Mr. Scott, house-surgeon to the hospital, and Dr. Pollexfen. Besides the subcuticular effusions already alluded to, there was a considerable accumulation of serous and sero-sanguinolent effusion in the cellular tissue in different parts of the body, and in the cavities of the pleuræ, pericardium, and peritoneum. Over the surface of the last-mentioned membrane (the peritoneum) there were also deposited several isolated patches of soft coagulable lymph, which had produced at various points adhesion of the folds of the intestines to one another, and to the internal serous surface of the abdominal parietes.

In this case, the consistence and other characters of the effused coagulable lymph were such as sufficiently indicated that it was the result of recent and acute peritoneal inflammation. That the child had perished of an acute disease was still further attested by the general plump condition of its body, and by the large deposit of fat in the subcutaneous tissue and other parts, which was observed on dissection.

The mother, Ellen C——, was a healthy young woman, of 22 years of age. It was her first pregnancy. She was not aware of having received any physical injury, or of having experienced any particular mental emotion, that

could enable her in the least degree to account for the death of the second child; and her feelings had never led her to suspect that any change had occurred in the contents of the uterus in the last periods of pregnancy.

Case II.—I was sent for, April 3, 1837, by Dr. Allan, house-surgeon to the Lying-in Hospital, to a case of difficult labour which he was attending in Blackfriars Wynd. The left arm was presenting, and, the membranes being entire and the passages well dilated, I at once passed up my hand into the uterus, turned, and delivered the child by the feet. It had been evidently dead for some time, as shown by the detachment of the cuticle from the abdomen and other parts. From the appearance of the child and the calculations of the mother, it seemed to have been born a few days before the seventh month.

On opening the body next day, Tuesday the 4th, along with Dr. Allan, Dr. Charles Bell, and Dr. R. Paterson, we found an effusion of reddish serum within the sacs of the pleuræ and pericardium; but the lungs and heart were healthy. There was a similar effusion within the abdominal cavity; and on the peritoneum covering the convex surface of the liver we observed various distinct patches of coagulable lymph, with corresponding points of a similar effusion upon the serous membrane lining the abdominal parietes and diaphragm. The adhesions formed between the opposed surfaces of the peritoneum at the points of the deposit were so slight, and the coagulable lymph forming them so soft in consistence, that they readily gave way under the manipulations required for exposing the contents of the abdomen. The mesenteric glands were large, some of them equalling in size the half of a small split pea.

The mother of the child was 36 years of age, and had borne six living children, besides having had a miscarriage several years previously, and another on the 13th of June last (1836). In this last abortion the child was expelled about the sixth or seventh month, and she herself attributes its death, and that of the fœtus whose history I have given, to an excess of hard labour, and more particularly to the exertion required in carrying loads of water up a long stair of three storeys. In her first pregnancies she had not been exposed to such toil. In her last pregnancy, the motions of the fœtus had continued from the first of January, when they were first felt, till eleven days before she was delivered. For two or three days previous to this last date, it moved "a great deal more," to use her own expression, "than usual."

Case III. — December 23, 1837. I examined, with Dr. Banks and Mr. Stewart, the body of a dead-born child, which had been sent to me for dissection on the previous day by Mr. Brown. It was a fœtus of about the seventh month; and the state of the cuticle and tissues in general showed that it had been dead for some time before birth.

The thoracic organs were healthy, though there was the usual quantity of pseudo-morbid reddish serous fluid in its serous cavities. On laying back the abdominal parietes, a patch of soft coagulable lymph was seen on the abdominal peritoneum near the right iliac region, and on further examination this was found to have formed a portion of a quantity of the same deposit, effused around the caput cœcum and its vermiform appendage. The peritoneum covering the liver and other remaining parts of the intestinal tube seemed healthy; but the peritoneal coat of the spleen was covered, more particularly on its outer or convex surface, with a thickish layer of coagulable lymph, which united it to the corresponding portion of the abdominal parietes by a large web of false membrane.

Mary C——, the mother of this child, is a strong and healthy young woman of 22 years of age. She had previously borne one living child. About a

fortnight before the birth of the dead-born fœtus above described, she had a fall down stairs; and to this accident she at the time ascribed the death of the infant, as it ceased to move in a day or two afterwards. At the present date, July 15th, she cannot recollect if the motions of the fœtus were greater than natural after the fall, previously to their final cessation.

Case IV.—On dissecting, January 8, 1838, the body of a dead-born male fœtus which had been for two or three months in my possession, I found the most marked effects of inflammation in almost all parts of the peritoneal cavity.[1]

The upper or convex surface of the liver, but more particularly of its right lobe, adhered to the corresponding surface of the diaphragm. The left edge of its left lobe was united by effused lymph to the spleen, and this latter organ was further morbidly adherent along its external surface, partly to the large intestine, and partly to the abdominal peritoneum. The omentum was connected at one or two points by coagulable lymph to the concave surface of the liver, and to the inferior part of the spleen. The small and large intestines were agglomerated together into a mass, and their corresponding surfaces intimately united at numerous points by effused lymph. In consequence of these adhesions the jejunum was intimately united to the sigmoid flexure of the colon. Both the tunicæ vaginales of the testes still communicated with the cavity of the peritoneum, and the serous surface of the left one was partially coated by a layer of coagulable lymph, or thin false membrane. The other cavities of the body were healthy. The child was not in an emaciated state.

I regret that I have not any notes of the history of the mother of this child.

Case V.—July 28, 1838. I examined in the Lock Hospital, with Drs. G. Weir and Allan, and Messrs. Scott and Bannatine, the body of a child of which one of the patients in the house had been delivered on the preceding evening.

The cuticle was loose and easily separated. The cavities of the pleuræ and pericardium were filled with a reddish serous effusion; but these membranes, with the exception of numerous points of purpurous effusion beneath them, were otherwise quite healthy. The purpurous spots were seen under both the pleura pulmonalis and costalis. The cavity of the peritoneum contained upwards of an ounce of a still deeper coloured reddish serous effusion, along with one or two clots of blood, which appeared to have come from a ruptured point in the lower surface of the right lobe of the liver. The edges of the laceration were partly reunited by coagulable lymph. A considerable portion of the liver in the neighbourhood of this part was much congested, more deeply coloured, and softer than the remainder of the viscus. The gall-bladder was filled with a quantity of viscid bile, and its coats were thickened, to about a line and a half or two lines, by a serous effusion into its cellular tissue. The surface of the abdominal peritoneum was coated by a beautiful lace-like and adherent layer of tough coagulable lymph, which was of considerable thickness at some points, and threw out long lines or films that were in contact with the surface of several of the abdominal viscera, but not apparently in any place adherent to them. This layer of lymph was particularly abundant in the left hypochondriac, and in the iliac regions. Several loose long films and masses of it were seen also among the intestines and upon the mesentery. The mesenteric glands were large. All the other abdominal and pelvic organs were healthy, with the exception of one of those small pediculated serous cysts adhering

[1] Recent preparations of the abdominal viscera, showing the particular morbid appearances described in Cases III. and IV., were shown at a meeting of the Medico-Chirurgical Society, and are still preserved.

to the right broad ligament of the uterus, which are so common in this part of the body of the adult female.

Helen G——, the mother of the child, is 19 years of age, and naturally of a healthy constitution, but she has now suffered under four different attacks of venereal disease. About fifteen months ago she had severe ulcerated sore throat and other secondary symptoms. During the course of the present pregnancy she entered, April 5th, the Lock Hospital under my care, affected with an ulcer and gonorrhœa of five days' standing. She was dismissed, cured, on the 20th of the same month. She re-entered the hospital 12th July, suffering under another recent attack of gonorrhœa, and with two slight ulcers; but was nearly well again when labour pains supervened on the 27th. The liquor amnii was in great quantity. The placenta was pretty firm and healthy, and had not the bleached anæmic appearance which it usually presents in cases in which the child has been dead for a week or two. The motions of the fœtus were not very sensibly felt by the mother after the 13th of July, but subsequently to that period they were repeatedly discovered by applying the hand to the abdomen, and the fœtal heart was most distinctly heard by myself and several of the pupils of the hospital, only five or six days before delivery. I counted its beats at that time at 25 in the 10 seconds. The mother was not aware of having been exposed, during the later periods of pregnancy, in any such way as could account for the death of the fœtus. She had an abortion about eighteen months ago, when passing through an attack of typhus fever.

Case VI.—On opening a dead-born male fœtus of the seventh month, which had presented by the breech and been delivered by Dr. Allan, I found, with that gentleman and Messrs. Scott and Bannatine, the following morbid appearances, on inspecting the body the day after birth, July 29th, 1838.

The cuticle was separated in many parts, and could be easily removed. The face of the fœtus was swollen and deformed with œdema; and the upper extremities, but particularly the hands, were also anasarcous. The feet and legs were likewise dropsical, though in a less marked degree, and there was a considerable amount of hydrocele. The cellular tissue of the scalp and loins was infiltrated with the usual reddish serous effusion. The cavities of the pleuræ and pericardium contained a similar fluid, but these serous membranes themselves, as well as the lungs and heart, were perfectly healthy. The cavity of the peritoneum was filled with a considerable quantity of the same effusion, and the surface of the abdominal peritoneum, more particularly on the right side, was covered with a lace-like layer of adherent coagulable lymph, which presented appearances and characters very exactly resembling those seen in the preceding case. Several masses and filaments of lymph were also seen among the convolutions of the intestine, and produced a pretty strong adhesion between them at one or two points. The spleen was large, and four drachms thirty-five grains in weight; its surface had several patches of lymph upon it, and the inferior portion of the organ was intimately and extensively united by morbid adhesions to the larger omentum. The mesenteric glands were large and well developed. The other abdominal organs were healthy.

The mother, Elizabeth H——, is a robust woman of 42 years of age. The present is her fourth child. The first was alive and at the full time. The second was believed to be at the full time, but was born dead. The third, like the present, was at the seventh month, and also dead at birth. She confesses to having been affected with venereal disease, but would not afford such information as to enable us to judge of the form of the affection, or the particular period at which she suffered from it. She attributes the death of the present child to her

having fallen down a flight of stairs about a fortnight before delivery. The placenta was adherent.

Case VII.—I had an opportunity of examining, February 21st, 1838, the following case of fœtal peritonitis with Dr. Fisher, under whose care the mother was delivered.

The appearance of the body of the infant was such as indicated that it had been dead for some time in utero.

The epidermis was peeling off in various parts. The muscles of the limbs were soft and flabby, and the periosteum was separated from the bones at various points. There was no serous effusion into the subcutaneous cellular tissue of the trunk and extremities, but the sero-sanguineous extravasation beneath the scalp, so frequent in dead and retained fœtuses, was strongly marked. Some effusion existed in the thoracic serous cavities, but the lungs and heart were healthy in structure. In the cavity of the peritoneum there existed a turbid effusion, with large flakes of coagulable lymph in it. On the upper or convex surface of the liver a few non-adherent patches of lymph were observable; and there was the same morbid effusion on the lower surface, particularly along the edge of the left lobe, where the lymph was firmer and adherent. The spleen had numerous patches of slightly adherent lymph scattered over its peritoneal surface. Similar patches were seen on the peritoneum of the colon, and produced at one point, near the sigmoid flexure, adhesion of two of the contiguous folds of that bowel. The peritoneal surfaces of the small intestines, mesentery, and abdominal parietes, had numerous flakes of coagulable lymph deposited upon them. Patches of lymph were adhering to the right Fallopian tube. The mesenteric glands were large. The mucous membrane of the stomach and intestines appeared healthy.

Ellen S——, the mother of this infant, is a stout young woman of 20 years of age; and had three years before a dead-born child at about the seventh month. It was believed to have been dead for some time before its expulsion from the uterus. In the present pregnancy the mother calculated that she was between the sixth and seventh month of utero-gestation when labour came on. She had not felt the child move for about twenty-three or twenty-four days before delivery; but during the two days preceding the cessation of its motions, these motions, she alleges, were distinctly much greater than usual. She cannot account in any way for the death of the child, except it be that she had a fall upon her right side the day on which its motions ceased; but the increased and morbid movements of the fœtus had been sensibly felt during the whole day preceding this accident.

Her general health was good during pregnancy, with the exception of occasional nausea, vomiting, and pain in the back. She denies that she ever suffered under any form of venereal complaint.

Case VIII.—I inspected, January 10, 1838, with Dr. Fairbairn and Dr. John Reid, the body of a fœtus that had died some time before birth. Its cuticle was separating in different parts, but its cellular texture was not much infiltrated.

The pleuræ and pericardium contained a reddish serous fluid, but the thoracic organs themselves were healthy. On opening the abdomen a considerable quantity of sero-sanguinolent liquid escaped, having numerous flocculi and large shreds of coagulable lymph floating in it. Similar shreds of loose coagulable lymph were found lying upon the peritoneal surface of the intestines at various points, but nowhere did this lymph seem to be adherent to that surface. On passing the handle of the scalpel among the loose intestines, it came out covered with patches and shreds of the substance in question.

The mother of the child, Mrs. M——, aged 26, had been exposed to much

fatigue and hardship during pregnancy, and her health had been very infirm during the whole period. The movements of the child ceased altogether fifteen days before its birth. On the day of their cessation it had moved with great and unusual violence, as if, to use the patient's own expression, "the infant were coming out at her side." Two days previously to this occurrence, the mother had been obliged to sleep in wet clothes after a long day's travelling on foot. She had borne two living children previously.

Case IX.—In a male fœtus between the fourth and fifth month, which I examined, July 7, 1838, with Dr. Allan and Mr. Bannatine, a few hours after its expulsion from the uterus, the peritoneal cavity contained a quantity of serous effusion, having numerous flocculi and shreds of coagulable lymph floating in it. Patches and small masses of this lymph were deposited in considerable abundance upon the peritoneum, covering the abdominal parietes and different abdominal viscera, but nowhere did we find any of this exudation adherent to the serous surface. The left pleura contained a quantity of clear, limpid, reddish-coloured serosity, without any flocculi floating in it, or deposited upon the surface of the membrane. The fluid in the cavity of the right pleura was turbid, and contained numerous minute masses of animal matter, the source of which was readily traced to a softened and pulpy condition of the corresponding lung, and to part of the broken down substance of the organ having escaped through a rupture in the pleura. Whether this state was the effect of intra-uterine disease, or of physical injury during or after birth, seemed to us impossible to be determined.

The mother, Frances G——, a healthy young woman of 18 years of age, had been under my care in the Lock Hospital from the 12th of April 1838 to the 26th of May. She was then suffering under a recent and severe attack of gonorrhœa, and had the remains of a chronic syphilitic eruption upon the skin. During her pregnancy she had been comparatively well in her general health till about a fortnight ago, when she had several attacks of chilliness and slight fever, with pain in the uterine tumour, increased by stooping. These symptoms lasted for three or four days, but were not so severe as to confine her to bed. Her last menstruation occurred five months and a few days ago. The fœtus was six ounces and two drachms in weight, and exactly six inches and a half in length. It had seemingly been dead for some days. The placenta was healthy, but in that white anæmic state which is generally seen in those cases of abortion and premature labour in which the infant has been for some time dead in utero.

Case X.—A case of peritonitis, similar in its anatomical character to the two last, is mentioned by Cruveilhier as having been met with by him in the instance of a child that was born with the abdomen large, and evidently containing a quantity of liquid. Death occurred about three hours after birth. On opening the abdomen there was found a great quantity of yellowish serosity, with some pseudo-membranous flocculi in the cavity of the peritoneum. The intestines and stomach were extremely contracted. The large and small intestines were filled with meconium. The stomach contained thick white mucus, like coagulated milk) but the child had not swallowed a drop of that fluid), and this appearance of the gastric mucus may, perhaps, M. Cruveilhier suggests as a query, be the effect of inflammatory action in the organ. The internal surface of the stomach presented a very marked punctated redness, in some parts of an irregular form, in others disposed in lines. The liver was large, and the spleen also increased in size, and dark coloured. The gall-bladder contained only some colourless mucus. Indurated and enlarged lymphatic glands surrounded the hepatic duct.

The lungs contained numerous small, but unequally-sized, red, spheroidal

masses of inflammatory induration like crude tubercle, both on their surface and in their substance.[1]

Case XI.—For the details of the following interesting case of congenital peritonitis, I am indebted to my friend Mr. Scott, who had an opportunity of seeing the child during life, and of examining its body after death, with Mr. Logan.

During the act of parturition, after the birth of the head, the expulsion of the body of the infant was prevented for some time by the distension of the abdomen. On examining the child shortly after birth, Mr. Scott found the belly marked with spots of purpurous or hemorrhagic effusion, especially at the sides; it was very tense, and fluctuation was indistinctly felt. Both hands were œdematous, the left more so than the right. There was no œdema of the lower extremities. The child was plump and fat, but cried only in the feeblest manner, and kept its legs firmly drawn up. It survived for twenty-eight hours only after birth; and, before death, œdema of the scrotum and penis took place, with an erysipelatous blush extending to the lower part of the abdomen. The bowels of the child had never been opened, though castor-oil had been twice administered to it; and little, if any, urine whatever had been evacuated. The infant was large, and had evidently reached the full term of utero-gestation.

On opening the body after death, some air and a quantity of fluid escaped, when an incision was made into the cavity of the abdomen. "Marks of inflammation," as Mr. Scott observes in the notes with which he has favoured me, "were obvious on the surfaces both of the abdominal and intestinal peritoneum, and from these surfaces I collected about a tea-spoonful of flaky puriform matter, exactly resembling that which I have found in my dissections of adult females who have died of puerperal peritonitis." The intestinal canal was pervious throughout, but the stomach, upper intestines, and cœcum, were much distended with air.

The left lung was not at all inflated; the right seemed to have been fully used. Spots of purpura were seen on the pleura of both sides. The internal surface of the contracted urinary bladder was covered with similar spots.

Mrs. P——, the mother of this infant, had previously borne three living children. A fortnight before her confinement with the dead-born child above described, she was exposed to cold and wet in walking from Portobello at night. On reaching home, she was seized with shiverings, which recurred frequently during the two following weeks. She did not feel the motions of the child after the night on which she first had rigors, and she herself believed that it had been killed by the exposure to which she had been that day subjected.

Case XII.—In a memoir read to the Royal Academy of Medicine in 1825, M. Veron, among other cases proving the existence of inflammatory and other diseases in intra-uterine life, adduced an instance of peritonitis, analogous in several respects to the case which we have last detailed. The case was observed in 1822, with M. Baron, on the body of an infant who had been brought dead to the Foundling Hospital at Paris. From the state of the umbilical cord, and the appearance of the child, it seemed scarcely to have survived a day after birth. On opening the peritoneal cavity, it was found to contain a quantity of purulent serosity, but not in any great abundance. There was an albuminous layer or deposit of coagulable lymph of about a line in thickness on the surface of the cavity, and so adherent to the membrane, that all the abdominal organs and

[1] *Anatomie Pathologique*, livrais. xv. p. 2.

intestines were glued together, and formed only one mass. The serous membrane itself was intensely red. The intestinal mucous membrane presented no such colour.[1]

Case XIII.—In the *Journal Général de Médecine*, M. Brachet has detailed the following well-marked case of acute inflammation of the peritoneum and substance of the liver, in a fœtus which was born dead at the full term of pregnancy. The body of the child was large and well developed, but its flesh was soft, its abdomen large and distended, and the skin had a yellow tint.

On inspection, the contents of the cranium and thorax were found healthy. The cavity of the peritoneum contained some reddish serosity, and its right superior part was occupied by some filamentous shreds of coagulable lymph, forming the rudiments of false membranes. The superior or convex surface of the liver was rugous, and adhered over almost all its right lobe to the corresponding portions of the abdominal parietes, by means of patches of pseudo-membrane that were not yet organised. The liver itself was very red and larger than natural; its tissue was friable and softened in its enlarged right lobe; on dividing it, an inodorous grey reddish fluid resembling purulent sanies, flowed from the cut surface. The other abdominal viscera were healthy, with the exception of a reddish state of the omentum.

The mother of this infant had, during the nine months of pregnancy, experienced only the usual indisposition attendant upon that state. Lively fœtal motions had been felt up to the middle of the eighth month. From that period till the supervention of the pains of labour they had become less and less sensible, and at last had ceased altogether during the act of parturition, which was extended to eighteen hours. It was her first pregnancy. The placenta was very large, and slightly gorged with blood, but in other respects healthy.[2]

Case XIV.—In 1821, a well-marked case of fœtal peritonitis and enteritis was observed by Chaussier in the Hospice de la Maternité, and reported by him to the Société de Médecine.[3]

The subject of the case, a male child, born about the seventh month, was well formed, and presented even a degree of plumpness. The abdomen was more distended and elastic than natural; and a glyster was given to it and returned with little effect. In the subcutaneous cellular tissue there was a slight serous infiltration, more particularly in the lower extremities. Its respiration was laboured, and it died in an hour and a half after birth.

On opening the abdomen about ten drachms of a yellowish viscid serosity, containing some small flocculi, flowed out. The omentum appeared somewhat thickened. The convolutions of the small intestines were so united and adherent to one another by a tenacious layer of concrete lymph, that they were formed into a single roundish mass, encircled by the course of the colon. On examining more minutely the small intestines, the cellular coat was found pale, thickened, and friable, and penetrated by a semi-fluid whitish matter or lymph, which separated it from the peritoneal coat. The cavity of the intestine was filled with greyish mucus; and the mucous membrane appeared thickened, and traversed here and

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[1] *Observations sur les Maladies des Enfans*, Paris, 1825, p. 17.

[2] *Journal Général de Médecine*, tom. cii. 1828, p. 43.

[3] *Bulletin de la Faculté et de la Société de Médecine*, tom. x. 1821, p. 242. The same case is mentioned by Billard (p. 242), as described by Dugès in his *Recherches sur les Maladies les plus importantes, etc., des Enfans nouveau-nés.* Paris, 1821.

there by small patches or circles of vascular injection. The other viscera of the abdomen, and those of the head and thorax, seemed healthy.

The mother of this child was a woman of 22 years of age, and pregnant for the first time. She had always enjoyed the best health, and had not met with any accident, or experienced any disagreeable symptom during the whole course of pregnancy. The labour was natural, speedy, and easy.

Cases XV.–XVII.—After quoting the foregoing case (XIV.) as given by Dugès, M. Billard, in his excellent treatise on the Diseases of Children, adds, that he "had found peritonitis to the same degree in three infants who died a short time after birth, and who were all fresh and vigorous. In none of these three cases had any symptoms of the peritonitis been observed during life, and it was only by post-mortem inspection that the cause of death was discovered. In one of them there was an abundant sero-purulent effusion, and the intestinal convolutions, which were very red exteriorly, were beginning to contract adhesions to one another." M. Billard does not state what particular morbid appearances were presented by the other two cases.[1]

Case XVIII.—In the slight summary which Professor Carus of Dresden has given, in his well-known work on Midwifery,[2] of the diseases of the fœtus, he states, "I have observed on the peritoneum of several chidren born dropsical, perceptible inflammation in several places, and once even the effusion of plastic lymph and adhesion."

CASES OF CHRONIC PERITONITIS.

Cases XIX., XX.—M. Billard, in the work already referred to, has alluded to two cases that had fallen under his own observation, of infants who died shortly after birth, and in whose bodies he found coagulable lymph effused upon the peritoneum in such a solid form as to indicate the existence of an inflammatory action, which had run through its different stages during intra-uterine life. The first of these infants died in eighteen, and the other in twenty-four hours after birth; and in both, solid, and apparently old, adhesions existed among the different intestinal convolutions. In one of them, the anterior or convex surface of the liver adhered by four very tough, although very slender, filaments to the anterior wall of the abdomen. One of the infants was lean, small, and very pallid; but the other had the usual plumpness of the new-born child.[3]

Case XXI.—In the second volume of his *Pathological Anatomy*, M. Andral mentions an instance in which he found all the intestines agglutinated together by intimate and very firm cellular adhesions, the result, as we presume, of old peritonitis, in an infant only two days old.[4]

Case XXII.—The best-marked case, however, of chronic peritonitis in the fœtus which we have been able to meet with, is one casually described by Morgagni. The subject of the case was an infant, who was brought to him with the umbilical cord not tied, and consequently that had probably not lived for any length of time after birth. With respect to size, it seemed to be of less than the full time. The body was not in any way decayed or putrid.

The lungs were of a red colour, degenerating into a dark brown, and parts of them, when laid upon water, immediately sank to the bottom.

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[1] *Traité des Maladies des Enfans*, Paris, 1837, p. 479.
[2] *Lehrbuch der Gynækologie*, Bd. ii. S. 251. [3] *Traité*, etc., *l. c.*
[4] *Anatomie Pathologique*, tom. ii. p. 737.

The abdominal cavity was filled with a large quantity of black blood, which was subsequently traced to have escaped from an erosion or laceration of considerable extent upon the concave surface of the liver. The whole of the upper or convex surface of the liver adhered to the diaphragm and corresponding parts of the abdominal parietes. At first sight, the mesentery and the intestinal tube seemed, with the exception of the rectum and lower part of the colon alone, to be entirely wanting; but, on further examination, these apparently deficient parts were found agglomerated into a small mass, under the lower surface of the liver, and covered over by a false membrane. This pseudo-membrane was of considerable thickness, of a tenacious consistence, and rendered rough by a kind of granular deposit. There was meconium in some of the upper intestines, but none in the rectum.[1]

GENERAL SUMMARY OF RESULTS.

The various cases which I have cited in the preceding pages will, I believe, be found to afford sufficient evidence for establishing the pathological fact, that the fœtus in utero is occasionally the subject of peritoneal inflammation; and by an analysis of the same and of other additional data, I shall now endeavour to trace out some of the leading and general circumstances regarding the morbid appearances left by the disease—the causes which are liable to produce it—the symptoms which most frequently indicate its presence—its most common terms of duration—the periods of gestation at which it most commonly occurs—and its effects upon the life of the fœtus. We reserve the discussion of its more indirect effects upon other morbid states of the abdominal organs for a future occasion.

MORBID APPEARANCES OBSERVED ON DISSECTION.

The nature of the morbid inflammatory effusions or products observed in the cases of fœtal peritonitis which we have related, has varied considerably.

In two cases (XVI., XVII.) the particular morbid appearances which were met with are not specified. In three (XI., XII., XV.) the morbid effusions into the peritoneal cavity presented more or less of a puriform character, combined with the presence of coagulable lymph; and in all the remaining cases, this latter morbid product (coagulable lymph or fibrin) was found either alone, or accompanied (as in Cases I., II., V., VI., VII., VIII., etc.) with a larger or smaller quantity of serous effusion. The coagulable lymph again has been seen in different cases under different forms. In three instances (VII., IX., X.) it consisted of unadherent flocculi and membranous shreds of various sizes, floating in the serous effusion, or lying on the

[1] *De Causis et Sedibus Morborum*, Ep. lxvii. sec. 17.

surface of the peritoneal membrane; in others (I., II., XIII., XVI.) it was still soft and pulpy, but was attached to the serous surfaces on which it was deposited, and produced even slight and lacerable morbid adhesions between some of the opposed points of these surfaces; and in four cases (V., VI., VII., XXIII.) it was found to present both of these characters, being in part adherent and in part still loose and unattached to the serous membrane.

In another set of cases again (III., V., VI., XIV.) the adherent coagulable lymph was still more advanced towards the process of organisation, and had assumed a somewhat firmer and more membranous character; in some instances being effused in such abundance as almost to agglutinate together into one mass (IV., XII., XIV., XXI.) a greater or less number of the abdominal organs covered by the peritoneum, or, where the effusion was more partial and limited, appearing in the form of a membranous (III.) or lace-like (VI.) web, or of threads or filaments (XIX.) passing between some of the morbidly attached surfaces and organs.

Lastly, in the more chronic cases, the effused coagulable lymph may, as we have seen, pass into a still more solid and pseudo-membranous form (XIX., XX., XXI.); or appear, as in the remarkable case quoted from Morgagni, under the character of a false membrane investing almost all the abdominal viscera, and containing in its substance some morbid bodies, not improbably analogous to those tubercular deposits which are so often observed in cases of chronic peritonitis in the adult, whilst, at the same time, this morbid membrane had exercised upon the included viscera that contractile power which is possessed in a greater or less degree by all organised lymph, whether it exist in the form of granulated cicatrices upon the external or internal surfaces of the body, or as organised false membranes, or morbidly developed fibrous tissue.

Complications with co-existent inflammatory disease in other abdominal organs and tissues, have been observed in only a very few of the cases. In one instance (XIV.), besides the layer of coagulable lymph upon the free surface of the peritoneum, there was a considerable effusion of semifluid whitish matter (concrete albumen, Dugès), into the cellular tissue of the smaller intestines, producing a degree of thickening and friability in the coats of the bowel. In a second case (XIII.), the peritoneal inflammation was accompanied by hepatitis in the stage of softening and incipient purulent infiltration; in another, to be presently quoted (XXIII.), the morbid changes in the same organ were of a more chronic character, the coats of the liver

being opaque and somewhat thickened, and the organ itself reduced in size. In one instance (X.), there were found some of those small masses of inflammatory induration in the lungs which form the most common type of pneumonia in the fœtus and infant.

In two cases (V., XXII.), there were in the peritoneal cavity coagula of blood, which had apparently proceeded in both instances from a rupture or laceration upon the concave surface of the liver. In the first of these cases (V.), the edges of the laceration had again become agglutinated together—a fact showing that the lesion must have occurred several days before death; and the congestion observed in the surrounding hepatic tissue was so great, that it might probably have acted as the predisponent, if not as the exciting, cause of the laceration.

In two instances (VI., X.), the spleen was unusually large, and in a case mentioned by Petit-Mengin,[1] which we shall have occasion to quote in our next communication, as an instance of the combination of ascites and peritonitis in the fœtus, the spleen was enormously hypertrophied, and had its peritoneal surface morbidly adherent.

In four of the cases (II., V., VI., VIII.), I have mentioned the very large size of the mesenteric glands. This is an appearance which I have now met with so often in my dissections of dead-born children, that I should feel inclined to regard it rather as a state natural to the fœtus than otherwise. Certainly, according to my own experience in such cases, the glands, if morbid in any way, are simply hypertrophied, and do not, as Oehler[2] would seem to imply, show some of the characters of scrofulous degeneration.

In two of the cases which I have related (V., XI.), minute hemorrhagic effusions, similar to those seen in Purpura Hemorrhagica, were observed in some of the internal organs of the body. This particular morbid appearance would, according to the experience of Cruveilhier,[3] seem to be not unfrequent in the bodies of fœtuses who have died in utero.

The *extent* of the inflammatory action in fœtal peritonitis, as shown by the post-mortem appearances, appears in the majority of cases to have been pretty general over the peritoneal surface; but occasionally (as in Cases II. and III.) we find it more or less limited to particular localities and portions of the membrane; and we shall

[1] *Gazette Médicale de Paris*, June 1833.
[2] *Prolegomena in Embryonis Humani Pathologiam*, pp. 34 and 44.
[3] *Anatomie Pathologique du Corps Humain*, livr. xv.

afterwards have occasion to point out the pathological importance of this fact, in reference to the production of congenital hernia by local inflammatory adhesions formed between the peritoneal surface of the descending testicle and some of the contiguous abdominal viscera.

EXCITING CAUSES OF FŒTAL PERITONITIS.

On the nature of the causes of peritonitis and other inflammations in the fœtus, we as yet possess very little accurate information. Internal inflammatory diseases in the adult are comparatively seldom the result of noxious agencies applied directly to the organ or tissue which is the seat of the inflammatory action, but are generally the result, as we think might be shown if this were a fit opportunity for discussing such a subject, of a variety of intervening morbid alterations which originate in the first instance in derangements of the secretions and other functions of the part to which the external exciting power is applied, and that subsequently react through it upon the economy in general, or upon that particular part of it in which the inflammation ultimately becomes located. These intermediate morbid states seem further capable, in different instances, of being produced by very different morbific agencies; and may probably in the fœtus, as in the adult, occasionally consist in, or be excited by, derangements in some of the natural secretory and excretory actions of the fœtal economy, as in the non-elimination of different matters from the fœtal circulation in the placenta of the mother, or in the introduction through the same channel of morbific substances previously existing in her system. We can have little doubt but that in the latter mode, the particular poisons exciting the specific inflammations characteristic of plague, small-pox, syphilis, etc., are conveyed from the mother to the fœtus in those cases in which the fœtus is attacked in utero by these diseases.

Causes more particularly referable to the conditions of the Mother. —In some of the cases of fœtal peritonitis which I have detailed, the mother had been exposed to severe labour (II.), or fatigue and exposure to cold and moisture (VII., XI.), or bodily injury (III., VI.? VII.?), during her gestation; in two cases (VIII., XXIII.), there existed general ill health during the whole of that period; and in one of these (XXIII.), the mother herself was twice attacked with peritonitis during the course of pregnancy. In two of the cases (V., IX.), the mothers had an attack of gonorrhœa during the period of utero-gestation, along with a syphilitic eruption in the one

instance (IX.), and ulcers in the other (V.) A third (VI.) confessed that she had suffered from venereal disease; and the line of life pursued by others of the number (III., VII., and I believe also IV.), was such as certainly freely exposed them to syphilitic infection. Indeed, it appears to me highly probable, from the investigations which I have already made upon this point, that a great proportion of those children of syphilitic mothers that die in the latter months of pregnancy, may yet be shown to have perished under attacks of peritoneal inflammation.

But before attributing to this, or to any of the above causes on the part of the mother, too great and exclusive an influence in the production of peritoneal inflammation in the fœtus, it must be recollected, that in other instances which we have brought forwards, as, for example, in Cases I., XIII., XIV., XXIV., the mother was not aware of being in any way exposed to any known morbific influence, and had not been the subject of any particular indisposition, either during pregnancy, or antecedently to it. Besides, that the disease in the fœtus may occur altogether independently of any morbid state of the maternal system, and from causes strictly originating in, and confined to, the fœtal economy itself, would seem to be shown by the first instance which we have related, where, in a case of twins, *one child only* was affected, whilst the other was healthy and lively, although they were connected to the mother by one common placenta, and consequently were both exposed equally to any morbific influence which the state of her economy might have been capable of exerting upon them. In some of the instances we have cited, the children born with peritonitis were, as in the case (I.) just now referred to, the product of a first pregnancy, and the offspring of a healthy mother (XIII., XIV.) In three instances the mothers had previously borne one or more living children (III., VII., XI.) But others of them (II., III., V., VI., VIII.) had already previously suffered from the abortion or premature delivery of a dead fœtus or fœtuses. In none of these latter instances have I as yet had an opportunity of examining two of the dead-born children of the same parents, to ascertain whether there may have been an identity of intra-uterine disease in them, but it seems not improbable, from other ascertained facts relative to intra-uterine pathology, that in certain cases such an identity of morbid action might be traced.

Causes referable to the conditions of the Fœtus.—In some instances, peritonitis in the fœtus would appear to be directly induced by

morbid physical conditions of the abdominal viscera, and by irritant fluids accidentally applied to the peritoneal surface itself. Legouais and Dugès[1] are said to have met with cases in which peritonitis in the fœtus had been apparently produced by an internal strangulation of the intestines. When the urethral canal of the fœtus has been impervious, the urinary bladder has often been found greatly distended with an accumulation of urine, as seen in numerous cases recorded by Ruysch, Portal, Sandifort, Meckel, Vrolik, Steghlehner, Chaussier, Billard, Howship, Wilson, Lee, Montgomery, and others. In instances of this kind, the distended organ seems liable to give way under the great morbid dilatation of its cavity,[2] and the effusion of urine into the cavity of the abdomen consequent upon the perforation of the viscus, would appear, as in the adult, to be followed by severe and fatal peritoneal inflammation, as exemplified in the following case recently detailed by Mr. King.[3]

Case XXIII.—On opening the hydropic abdominal cavity of a fœtus of the fourth month, it was found to contain a considerable quantity of opaque viscid fluid, having numerous soft flakes of fibrinous matter floating in it. The natural gloss of the peritoneum was a good deal destroyed; and the surface was in parts slightly coated, as with fibrin. The liver was reduced in size, and had become much rounded in figure; its tunic was opaque and somewhat thickened. With this organ the bowels were collected into a bunch, in the middle of the superior part of the abdomen. The urinary bladder extended to the umbilicus, had a globular form, and was so distended as to be capable of containing above half-a-pint of water; its coats were decidedly thickened. A little behind its summit a perforation was found, around which the vesical tunics were very much reduced, as if by absorption from the pressure of distension. This ruptured opening of communication from the bladder into the peritoneum was a simple fissure, rather less than half-an-inch in length, and its margins were extremely thin. The ureters were enlarged, tortuous, and somewhat thickened. The kidneys were small, and not materially affected by the internal pressure. The urethra was imperforate from the prostate gland forwards. No very decided alteration was seen in any of the other organs.

The mother of this child, aged 27, was of a strumous appearance, and menstruated irregularly. After having been married eighteen months, she became pregnant with the above infant. She appeared to suffer from peritonitis at an early period of her pregnancy, and subsequently continued more or less ailing and delicate. The premature parturition was preceded by an attack closely resembling peritonitis. She did not suppose herself with child until the time of her delivery. The fœtus, a male, was born dead, with a full ascitic abdomen, and the abdominal parietes very considerably distended and attenuated.

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[1] *Cyclopædia of Practical Medicine*, vol. iii. p. 291; and *Billard*, p. 483.

[2] In one recent case which I had an opportunity of examining with Dr. John Moir, the muscular and mucous coats of the dilated bladder seemed entirely removed at one circumscribed point, and the peritoneal tunic alone remained to prevent the effusion of urine into the abdominal cavity.

[3] Guy's Hospital Reports, No. v. p. 508.

In two cases that we have detailed (V., XXII.), in which there were coagula of blood in the abdominal cavity, from a partial laceration of the substance of the liver, could the peritoneal inflammation have been excited in consequence of the effused blood acting as an irritant upon the serous membrane ?

In connection with these instances of inflammation of the peritoneum, originating in direct physical and chemical injury of the membrane itself, I may here mention, as cases in all probability referable to a somewhat similar principle, that I have repeatedly observed an effusion of patches of coagulable lymph upon the peritoneal surface of the intestines and other abdominal viscera, in instances of monstrosity consisting in the extroversion of these viscera from a partial deficiency of the abdominal parietes ; and I have seen this both in the human fœtus and in that of the lower animals. Thus, for example, I find that among the short notes which I made some years ago, of various cases of fœtal monstrosity contained in the Museum of Guy's Hospital, London, I have incidentally marked the existence of an effusion of coagulable lymph upon some part of the peritoneum, as visible in three of the cases in which there was general extroversion or hernia of the contents of the abdomen, from the deficiency alluded to. One case (2542 A) is described as having " some fibres of coagulable lymph upon the peritoneal surface of the liver and protruded intestines ; the head of the fœtus is much malformed, and probably it was one of those instances in which this part adhered by inflammatory false membranes to the inner surface of the placenta or amnion. There is also a strong thread or band, probably composed of organised lymph, attached to the skin over the external side of the left elbow." The second case is marked as a " fœtus with harelip and extroverted heart and abdominal viscera, and with apparently a few patches of coagulable lymph upon the peritoneum and pericardium :" and the third case (2550 A), a malformed fœtal pig, is mentioned as having, among many other anomalies of structure, " the extroverted abdominal viscera partially surrounded by a transparent serous-like membrane, which has strings of coagulable lymph attached to it." I have now seen in other pathological collections several additional instances of similar partial effusions of coagulable lymph upon the peritoneum, and even intimate morbid adhesions between the contiguous serous surfaces of such abdominal viscera, as happened to be protruded in cases of fœtuses with malformations resembling the above. We may here observe also, that Scarpa, in his treatise on Hernia, mentions and represents[1]

[1] *Treatise on Hernia*, Wishart's translation, p. 377, and Plate xiv. Fig. 2.

a case of umbilical hernia in the human fœtus, in which a considerable portion of the jejunum adhered, no doubt in consequence of previous peritonitis, to the entrance of the hernial sac; and the same author, in another passage of his work,[1] points out the "firm adhesion" contracted by the protruded abdominal viscera to the hernial sac, in instances of congenital umbilical hernia, as one of the causes opposing reduction, and leading to the early death of almost all those infants that are born affected with this disease.

SYMPTOMS OF FŒTAL PERITONITIS.

In the prefatory observations made to the present communication, I have already taken occasion to allude to the almost insuperable difficulties which are opposed to our arriving at any accurate knowledge of the symptomatology of intra-uterine diseases; and the present affection only affords too apposite an illustration of the remark in question.

In eleven only of the preceding cases have we any account whatever of the condition and feelings of the mother during the period of pregnancy. In four (I., VII., XII., XXI.) out of these eleven cases, nothing seems to have occurred that was calculated to direct the particular attention of the mother to anything peculiar in the condition of the fœtus; in three (III., V., X.), the cessation, about a fortnight before delivery, of the motions of the fœtus as felt by the mother, was the only circumstance remembered, and in one of these cases (V.), the fœtus certainly continued to live for some time after this occurrence; in another case (XI.) the motions of the infant became less and less sensible during the last two weeks of gestation; and in the three remaining instances (II., VII., VIII.), these motions, after being much and morbidly increased for two or three days, ceased entirely and rather suddenly, at a period varying from eleven (II.) and fifteen (V.) days, to upwards of three weeks (VI.), before delivery. This last combination of symptoms—namely, a great, but temporary, increased degree of the fœtal motions, attended occasionally with spurious pains, and followed by the sudden and final cessation of all perceptible movements on the part of the infant—may, we believe, be not unfrequently noticed in cases of acute and fatal peritonitis of the fœtus; but, at the same time, it must be held in recollection, that this same sequence of morbid phenomena is common to peritonitis, with all those diseases of the fœtus in utero which are similarly acute and fatal in their character,

[1] *Treatise on Hernia*, p. 378, § 6.

and consequently they cannot by any means be held as diagnostic marks of peritoneal inflammation alone. We omit here, as we have done in the detail of individual cases, the recapitulation of various well-known but equivocal symptoms in the maternal system, of the death of the child, such as rigors, a sense of weight in the tumour of the uterus, flattening of the abdomen, etc.; because these signs, when they do occur, can only be regarded at best as probable indications of the death of the fœtus, without leading in any way to a knowledge of the cause of that event.

When the child has been born alive, but affected with congenital peritonitis, it has sometimes, in the more chronic forms of the disease, been emaciated (XIX.), but not always so (XX.); and in the more acute cases, when any great degree of change is observed in the condition of the child in regard to its natural condition of fatness and plumpness, we shall in general be justified in ascribing it to other causes besides the peritoneal inflammation, as we know that this disease may even prove fatal without bringing down the state of the little patient in this respect (XIII., XIV.) In several cases the abdomen was swelled and fluctuating at birth (V., X., XI., XIII., XIV., XVIII.); sometimes even tense and tender to the touch (XXIV.) With the abdominal effusion a certain degree of hydrocele generally exists in the tunicæ vaginales of male infants (as in Case VI.); and in some there has also been observed a co-existent degree of dropsical swelling in other parts of the body, as in the hands (XI.), in the upper extremities and face (VI.) in particular, or in the lower extremities, and beneath the skin of the whole body (XIV.)

In two of the cases, the children's skin presented at birth the yellow discoloration of jaundice. In one of them, that was dead-born (XIII.), the liver on inspection was found to be the seat of acute inflammation, and commencing purulent infiltration.[1] In the

[1] Baumes, in his *Traité de l'Ictère des Enfans de Naissance* (Paris, 1806), mentions an interesting case (p. 45) of congenital jaundice complicated with hepatic inflammatory disease. A mother, who was herself much affected with jaundice during pregnancy, produced a child with both skin and conjunctiva sensibly discoloured. The child, whose right hypochondrium was very prominent and hard at birth, died under increased symptoms of icterus in four or five weeks afterwards. On opening its body, the tissues of the abdominal parietes and of all the abdominal viscera were seen to be stained yellow. The liver was very large, particularly the left lobe, which was morbidly adherent on its surface to some neighbouring parts, and softened in its substance. The right lobe felt indurated, and its lower or concave surface contained a small abscess. The gall-bladder was half-filled with a greenish, limpid, slightly bitter fluid. The ductus choledochus seemed obstructed by a viscid yellowish matter. The stomach was much contracted.

second case (XXIV.), which will be subsequently more particularly described, the child was born alive and survived.

Again, in other instances of congenital peritonitis, none of the equivocal symptoms here alluded to have been remarked, and the cause of death has only been discovered by the post-mortem dissection (XV., XVI., XVII.)

DURATION OF FŒTAL PERITONITIS.

We have as yet but few data on which we can rely with any great degree of certainty for fixing the general duration of attacks of peritonitis in the fœtus. We have enough, however, I believe, to show that, contrary to the surmises of some pathologists, inflammatory action may occasionally proceed with nearly as great a degree of acuteness and severity in intra-uterine life as after birth. In some of the cases of peritonitis that have been related (I., II., XX.), the plump and unemaciated condition of the fœtus after death affords very strong evidence that the fatal morbid state under which it had suffered had not been long in its duration. In others, those symptoms of increased movement and restlessness in the fœtus which indicated the occurrence of acute disease in some part of its system, were only remarked for one (VII.), two (VIII.), or three (II.) days before its death; and in one of these cases (VII.), we have further corroborative evidence of the occasionally very acute character of the disease in this circumstance, that the apparent exciting cause of the peritonitis was applied only two days previous to the death of the fœtus, as indicated by a sudden and total cessation in its motions subsequently to a greatly increased degree of them. In two other cases (III., XI.) also, the fœtal movements ceased in the course of a day or two after the supposed exciting cause of the fœtal disease had operated upon the maternal system. Besides, the inspection of the dead body, in this and in other instances (as in I., II., VIII., IX., X., XII.), presented such morbid appearances as corresponded only with those left by the more acute and rapidly fatal forms of peritonitis in the adult. Again, in other cases, the state of emaciation, and hence, probably, of long-continued disease (XIX.), combined with the particular appearances found on dissection (XIX. to XXII.), show in as unequivocal a manner that in these instances the inflammatory action must have been of a decidedly chronic character.

PERIODS OF FŒTAL LIFE AT WHICH PERITONITIS OCCURS.

Velpeau, in his elaborate treatise on Midwifery,[1] without specifying any particular diseased appearances, remarks in general terms, that he "had seen incontestible morbid alterations in the lungs, liver, *peritoneum*, and other parts of the body, at the *third* month." I have certainly, in several different specimens, observed unequivocal evidence of inflammation and morbid adhesions between different points of the cutaneous surface of the embryo, at a period as early as, or even earlier than, that mentioned by Velpeau; and although I have adduced no case of peritonitis at that age, we shall take occasion, in our next communication, to show reasons for our belief, that we may yet be able to trace many of the malformations of the abdominal and pelvic viscera, as well as those of different other parts of the body, to different diseased actions, but particularly to inflammation occurring in some of their structures during the earlier stages of their embryonic development and growth.

In some of the instances of fœtal peritonitis brought together in the present paper, the particular age of the fœtus is not noted. Of the remaining cases, the earliest are two (IX. and XXIII.), in which the fœtus was considered about four months old, or between that and the fifth. In two instances (II., VII.), the child was believed to be between the sixth and seventh month; in three (III., VI., XIV.), about the seventh month; and in others again, near to (V., XVIII.), or apparently at, the full time (I., V., VIII., XI., XIII.) Most of the children who were affected, but still alive at the period of birth (as in Cases X., XI., XVI., XVII., XXIV.), may also be presumed to have nearly, if not fully, reached the complete term of utero-gestation, before the supervention of the disease.

EFFECTS OF PERITONITIS UPON THE LIFE OF THE FŒTUS.

If I might be allowed to draw any general conclusion from the comparatively limited opportunities which I have as yet enjoyed of investigating the diseases of the fœtus, I should certainly feel inclined to regard peritonitis as much more frequently fatal to the fœtus during the latter months of pregnancy than any other individual acute disease to which its economy is liable. I had occasion to see nine of the cases which I have related, in dispensary and hospital practice, within a period of twenty-three months. During the same period I have met with other inflammatory diseases in the

[1] *Traité Complet de l'Art des Accouchemens*, tom. i. p. 392.

fœtus, but certainly with no single one in so many individual instances. According to the observations also of Professor Chaussier and Madame Boivin, peritonitis would seem to have been not unfrequently met with by them in their dissections of the still-born children at the Hospice de la Maternité at Paris.[1]

In a considerable number of the cases which have been narrated in the preceding pages, the peritonitis seems to have been so acute and severe as to prove fatal to the fœtus before birth.

In eight of the cases (I., II., III., V., VI., VII., VIII., IX.), the children had evidently been dead for some considerable time before their expulsion from the uterus, as shown by the decomposing state of their bodies. In one (XIII.), the infant, though dead-born, was thought to be alive up to the commencement of parturition. In the first three cases of chronic peritonitis, the children were born alive, and survived to periods varying from eighteen (Case XIX.) and twenty-four hours (XX.), to two days (XXI.) after birth. In several of the acute cases also, the child was born affected with the disease, and did not die till three hours (X., XIV.), nearly a day (XII.), or even longer (XI.), after the time of birth. In one example, indeed, recorded by Professor Desormeaux, a child born with all the most marked symptoms of congenital peritonitis rallied completely after birth, and survived. The following are the interesting details of the case as given by Desormeaux himself.

Case XXIV.—"I had under my care," he remarks, "some years ago, an infant whose mother's health had been excellent during the whole period of pregnancy. The infant at birth was extremely emaciated; the surface of its body was of a yellowish-white colour; and it had an expression of suffering, and, as it were, of old age, strongly imprinted on its countenance. Further, the little patient had the abdomen swelled, hard, and tender; the intestinal convolutions could be traced under the integuments; and all announced an intense and already chronic enteritis. The infant was intrusted to a good nurse; and, notwithstanding its feebleness, it was able first to receive some drops of milk, and after a time to suck. It has since become," M. Desormeaux adds, "a very fine child, and enjoys good health."[2]

From peritonitis forming so often a direct cause of death to the fœtus, its study, as that of other fatal forms of intra-uterine disease, becomes a matter of interesting inquiry to the practical

[1] "Nous avons rencontré, avec M. le Professeur Chaussier, que nous avons longtemps accompagné dans ses recherches sur les maladies du fœtus, un certain nombre de cas de péritonite, avec ou sans épanchemens, et toujours accompagnés d'adherences plus ou moins multipliées des intestins."—Mad. Boivin, *Recherches sur une des Causes de l'Avortement*, p. 56. See also a note by Chaussier at pp. 34-35 of his *Mémoire sur la Viabilite de l'Enfant Naissant*, Paris, 1826.

[2] *Dictionnaire de Médecine*, Art. Œuf, tom. xv. p. 403.

accoucheur, as bearing strongly upon the important question of the various causes by which abortion and premature labour may be induced. And certainly the attention which has of late years been bestowed upon intra-uterine pathology has been useful in eliciting a higher degree of information on that subject; for the more our knowledge of the diseases of the fœtal economy has increased, the more have accoucheurs become convinced of the truth and practical importance of the fact, that the causes of abortion, and of the death of the fœtus during the different periods of pregnancy, are, in many instances, not to be sought for in any diseased condition of the general system of the mother, or in any morbid state of her reproductive organs, but in diseased actions originating in, and more or less strictly confined to, the fœtal appendages, or to the organs or tissues of the body of the fœtus itself. Besides, I feel much inclined to believe, that to these fœtal diseases, and more particularly to certain degrees of inflammation, and to the results or products of that morbid action in different parts of the body of the fœtus, when it happens to be of a local and limited, and consequently not of a fatal character, we may yet be able to trace the origin of various morbid states, the true nature of which is at present little suspected.

ON INTRA-UTERINE GOITRE, OR BRONCHOCELE.[1]

Various kinds of tumour in the cervical region of the fœtus have been found at the time of birth.

1. The cervical portion of the vertebral column is sometimes, though not so often as the loins or back, the seat of spina bifida; and the resulting tumour has been seen to vary in size from the bulk of a nut to that of the infant's head.

2. Meckel, Otto, and other pathologists, have described a variety of congenital cystic tumour of the cellular tissue, situated on the posterior part of the neck, and remarkable for a central pillared division, into two lateral and symmetrical lobes, by the ligamentum nuchæ. I have seen it mistaken for a spina bifida.

3. Numerous instances of intra-uterine tumours in the anterior and lateral portions of the cervical region have been recorded of

[1] See Proceedings of Medico-Chirurgical Society of Edinburgh, February 7, 1855, in *Edinburgh Monthly Journal of Medical Science*, April 1855, pp. 350 and 351.

late years by Berndt, Cæsar Hawkins, Beatty, Mütter, and others, under the name of cysts, or "congenital hydrocele" of the neck. These tumours, which sometimes grow much after birth, usually consist of one, two, or more large serous cysts, capable of being emptied and obliterated by puncture and the injection of iodine; by setons, etc. Sometimes an agglomeration of small cysts enters also into their composition.

4. A kind of large cystic tumour, the mass of which consists of a numerous collection of small cells filled with thickish glairy fluid, is occasionally observed at birth in the upper part of the neck, and projects more or less into the mouth. It seems to be a true Ranula, originating and consisting of hypertrophy and enlargement of the follicles of the salivary glands. I have seen two instances of it where the children died a few days after birth, the puncturing of one or two cells being of no use in diminishing the mass. There is a specimen of it in the Obstetric Museum of the University, forming a large tumour at birth. This form of apparent cystiform tumour has, I believe, been frequently confounded with the third variety alluded to above.

5. Among the tumours on the neck at birth, I have seen one remarkable instance of a large flattish swelling on the posterior cervical region, covered with skin of the usual colour and appearance, and formed of a deep-seated erectile vascular tissue, which in a great measure disappeared under pressure, and enlarged when the child cried or strained. I treated it by various means, none of which produced complete obliteration. Some years afterwards I heard that it was cut into by a surgeon, and the resulting hæmorrhage was most excessive.

6. Few cases of congenital enlargement of the thyroid gland, or of true intra-uterine goitre or bronchocele, have been hitherto placed upon record. The following cases, however, will show that goitre constitutes one form of cervical tumour, which may be occasionally met with at birth. Bronchocele is sometimes hereditary, but very few instances of it have been seen at birth in infants thus predisposed. Usually there is no trace of it till some years subsequently. The following is the only exception to this general remark which I have been able to find:—

Case I.—In an essay on goitre, published in 1824, M. Ferrus refers to a congenital instance of the disease, which had occurred in the practice of M. Godelle,

physician to the Hospital of Soissons, and where the mother was affected with the same disease.[1] The child only survived for a few hours after birth.[2]

Lately I met with a marked instance of intra-uterine goitre in my own practice, and had an opportunity of ascertaining its true nature by dissection.

Case II.—The mother of the child never suffered from any symptoms of goitre, or lived in any place where the disease was endemic. She has now borne ten children. The first seven of these infants were still-born. They all died, I believe, from the reports given to me, of disease of the placenta, and not from any malady or malformation in their own bodies. During her last four pregnancies she has been under my professional care, and has taken always, in the latter periods of utero-gestation, large and continuous doses of chlorate of potass. The four last children were born alive, and have continued to live, with the exception of the last, namely, the one born with goitre. It survived only for about eight hours after birth, and would have died much earlier from asphyxia, if a catheter had not been retained in the trachea to obviate the compression of the mass of bronchocele. The child was born two or three weeks before the full term, labour having been induced in consequence of the child's heart beginning to beat with morbid slowness. The goitrous enlargement of the thyroid gland was nearly of the size of a hen's egg. It rendered the labour tedious, by preventing —as the hands or arms placed in the hollow of the neck sometimes do—the proper flexion of the head, and the approach of the chin to the sternum; the presentation in consequence being one of the forehead, and not of the parietal bone. The goitre, or bronchocele, as seen after birth, appeared to fill up entirely the space or hollow between the chin and sternum. On examination after death, it was found to surround almost entirely and compress the trachea. All parts of the thyroid gland were equally affected. The goitrous tumour was comparatively smooth on its surface, but had

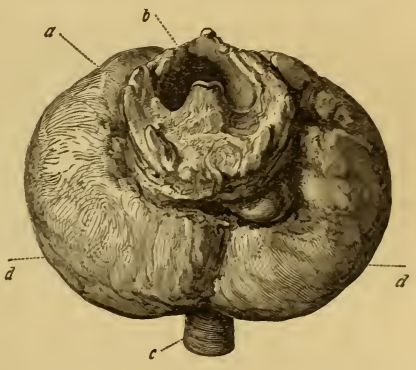

Fig. 1.

[1] *Dictionnaire de Médecine*, vol. x. p. 283.

[2] In the *Archives Générales de Médecine*, vol. xiii. p. 76, Dr. Cassan speaks of a remarkable case of hereditary goitre, where a young infant in the family died of it; but whether it was congenital or not in this child is not precisely stated. "A woman, aged 23 years, married, affected with pulmonary consumption in the second stage, presented to us an example of the obstinate hereditary predisposition of pulmonary phthisis and of goitre; her young infant (*jeune enfant*), her father, and seven brothers of her father, had died of the former disease; one of her paternal aunts, who showed no disposition to phthisis, carried a very large goitre; herself (the patient) was affected with goitre, which had considerably diminished since the first symptoms of phthisis had been developed. All her brothers and sisters had been victims to that cruel affection; only one sister, who had a goitre commencing, enjoyed good health at that period. One could say in that family, that the two affections were in such relation, that the one appeared reciprocally to supplant the other."

a small irregular nodule attached anteriorly to its upper border, close to the body of the hyoid bone. In the accompanying woodcut (Fig. 1), *a* represents the hyoid bone, *b* the epiglottis, *c* the trachea, and *d d* the right and left sides of the goitre respectively.

Internally, it presented a firm glanduloid structure ; and under the microscope it appeared to consist of the usual thyroid tissues, greatly hypertrophied. The vesicular cavities of the gland seemed not only increased in number, but enlarged in size also, and the septa between them were thickened. They were distended with epithelial contents. The external surface of the brain of the child was surrounded with a large quantity of serum, and the brain itself was considerably below the usual size. The opening of the eyelids was also small. The thymus gland, supra-renal capsules, etc., were normal in size and structure ; and there was no other unusual appearance detected.

In his essay on the pathological anatomy of new-born infants,[1] Dr. F. Weber describes an example of congenital goitre, similar in several respects to the preceding instances.

Case III.—A child was born some weeks before the ninth month, and it survived only a few minutes. The goitrous thyroid gland projected forward in the cervical region, was about half-an-inch thick, and extended not only laterally, but also backwards, some distance over the upper part of the trachea, though not to such a degree that a union of both lateral lobes had occurred posteriorly. On being cut into, the parenchyma of the bronchocele appeared dark red, and the microscope showed within it a quantity of effused blood-globules, which were not evident to the naked eye. In other respects, the parenchyma of the tumour presented internally the normal structure of the thyroid gland. The thymus gland appeared also larger than usual, and particularly on one side, but without any change of structure. There was a considerable degree of hydrocephalus present, with contraction of the extremities.

Case IV.—When describing the case No. II. to the Medico-Chirurgical Society, immediately after the time of its occurrence in February 1855, Dr. Keiller stated that he had, a few months previously, met with an instance of the same disease, where the child's head at birth offered the same unusual presentation. I have lately examined the child, who is now about a year old, with Dr. Keiller. There is still a large irregularly lobulated swelling in the region of the thyroid gland, and stretching somewhat upwards on each side of the trachea. It projects forwards, and appears to swell out when the child cries. At other times, the skin of the neck looks flaccid, wrinkled, and empty, over the site of the tumour, in consequence of the tumour itself having diminished and shrunk considerably since the time of birth. The lobulated masses of the tumour feel firm and hard to touch ; and probably the intervening and connecting tissue, in which the absorption has been specially marked, was originally more cystic in its character. The tumour does not seem to affect in any way the general health and growth of the child. The mother was born and brought up in the county of Cumberland, where goitre is not uncommon ; but neither she nor any of her relatives were ever in the least degree affected by it. The present goitrous infant is the first child which she has borne. Before pregnancy occurred, she was under my care for chronic metritis ; but her general health is good.

An instance of congenital cervical tumour, under the title "Scrofula in Fœtu," was long ago described by Francus,[2] with characters and a site which have made

[1] *Beiträge zur Path. Anatomie der Neugebornen*, p. 84.

[2] *Ephemer. Nat. Cur.* Dec. ii. An. v. Obs. 223.

Graetzer and Montgomery refer it to the head of goitre. In this, as in Dr. Keiller's case, the certainty of the tumour consisting of enlargement of the thyroid gland was not made out by dissection.

Case V.—The child—a boy—presented at birth a tumour on both sides of the neck, but it was largest on the left. When the infant cried, or moved its neck too freely, that on the left side swelled excessively, and appeared to interfere with the power of suction and deglutition. Francus adds, that he unsuccessfully tried to effect the removal of the swelling by various remedies, local and general, and that notwithstanding it increased daily in size.

ON THE

RUDIMENTARY REPRODUCTION OF EXTREMITIES AFTER THEIR SPONTANEOUS AMPUTATION.[1]

On the stumps of limbs that have seemingly undergone an early spontaneous amputation in utero, there is often seen a species of anormal structure, which has not yet, as far as I am aware, been described in any existing work on the subject of monstrosities. I allude to the appearance on the end of many such stumps of a projecting mass or nodule, varying in size from a small cutaneous ridge to the bulk of a walnut, and having protruding from its surface one, two, or more still smaller fleshy divisions or projections, which are provided at their extreme points with nails.

This variety of anormal structure is by no means rare. Several years ago, when searching for instances of it, I found five or six living examples in Edinburgh and its neighbourhood; and I have seen some, and heard of many more, living in different parts of Scotland and England. It is interesting, however, not so much from the frequency with which it is met with, as from the nature of the anormal structure itself, consisting, as I believe it does, of a tendency in the human subject to the reproduction of a lost extremity.

As a general law, the power of repairing and reproducing lost parts decreases as we ascend from the lower to the higher parts of the animal scale. In the lowest and simplest forms of animal life, as in polypes, not only are separated parts or segments rapidly restored, but the separated segments themselves sometimes become developed into whole and perfect individuals. A hydra was cut at different times into various portions by Trembley, and fifty separate individuals of the species were developed from the segments of one.

[1] See Proceedings of Medico-Chirurgical Society of Edinburgh, May 5, 1841, and of Edinburgh Obstetric Society, March 12, 1848, in *Edinburgh Monthly Journal of Medical Science*, July 1841, p. 537, and June 1848, p. 890.

Johnstone and Dugès have shown that animals with a much higher organisation — namely, the planariæ — could in the same way be multiplied by artificial subdivision; and Lyonnet and Bonnet found the same true of the Nais. As we ascend upwards in the scale of life, all power of self-development in separated parts or segments disappears, but the power of regenerating these lost parts or segments is retained to a greater or less degree by the general body of the animal. When the arms or rays of a star-fish are broken off artificially, or when they are thrown off, as they sometimes are, in the lingthorn or lluidia, etc., by a true "spontaneous amputation" on the part of the animal, the lost arms are betimes entirely restored. In crustacea a separated or amputated limb is also rapidly renovated. The head or anterior rings of the earth-worm and other annelida are generally regenerated after their decapitation; and the power of reproduction is still so great in the mollusca, that the snail, according to Schweigger, has sometimes its head and antennæ restored after they are removed by amputation, provided the cephalic ganglion lying above the œsophagus be left uninjured. In the lower divisions of the vertebrata we have the salamander still capable of reproducing an entire leg or tail, or even of forming a new under jaw; and the triton can regenerate, as in Blumenbach's experiments, a complete and perfect eye. But in the higher and warm-blooded vertebrata this power of repairing and restoring lost compound parts and organs seems totally or almost totally wanting. In man not only are complex individual parts, however small, generally held incapable of restoration, but portions of the higher individual tissues even, as mucous membrane, muscle, etc., when cut, removed, or destroyed, are not usually regenerated in their entire organisation. To this general law, however, there are the following exceptions in the human subject:—

1st. When the part removed is primitively of a lower type of organisation than that of the general body, restoration sometimes occurs. Thus, in a case of a child born with an additional thumb, or with a thumb double from the first joint, the outer or smaller one was amputated by Mr. White of Manchester. It grew again, and along with it the nail. Subsequently Mr. Bromfield of London a second time carefully removed this superadded portion of thumb, and turned the ball of it fairly out of the socket. "Notwithstanding this," adds Mr. White, "it grew again, and a fresh nail was formed."[1]

[1] *Regeneration of Animal and Vegetable Substances*, p. 16.

2d. In those animals that possess, in the most marked degree, the power of readily regenerating lost compound parts, this power resides specially in the extreme points of the body, as the tail and limbs. In the human subject we sometimes find instances of an appearance of permanence of the same power in the extreme parts, as the fingers and toes. I have seen a distinct but imperfect nail grow on the end of the second phalanx of the finger, after the complete amputation of the first phalanx. Similar instances of nails, and consequently of the matrices of these nails, becoming regenerated on the tips of fingers amputated through their first joint, have been recorded by Corvisart, Ansiaux, Blumenbach, and others.

3dly. When, in the human subject, the removal of a compound part—such as a portion of an extremity—is effected in early fœtal life, and consequently at a time when the physiological powers of the young human being are more assimilated to the reparative and other powers of animals of a lower type in the animal scale—the lost part seems capable of at least a partial and rudimentary restoration. In the animal kingdom generally, we find the power of regeneration greater in the inverse ratio of the degree of development or age of the individual. The more perfect hexapod insects never reproduce a lost limb; but in the larvæ of these same insects, limbs and antennæ are restored after their removal. The experiments of Heineken show that the arachnida, in the same way, lose the property of regenerating their legs after they have ceased to change their skin, and have reached their full or adult development. It is only in the young frog that reproduction of a limb occurs; and Spallanzani found that the rapidity with which the tail of the tadpole and the limbs of the salamander are regenerated, was always in an inverse ratio to the age of the animal. So, while in the human subject after birth we never see any trace of the reproduction of a limb after amputation, we have the contrary, as I believe, evidence of the possibility of their rudimentary regeneration in the appearances sometimes seen on the ends of stumps resulting from spontaneous amputation in early fœtal or embryonic life.

In most of the cases in which I have observed this appearance of a rudimentary reparation of an extremity, the spontaneous amputation had occurred in the upper half of the forearm; and the general resemblance of these cases to each other is very remarkable. Usually the rounded end of the limb has exactly the appearance of a stump after amputation, and is well covered with soft parts. Two points of the skin, or rather of the subcutaneous tissue, are

found adherent to the ends of the ulna and radius, and present a depressed or umbilicated form, particularly when the forearm is flexed and moved, and the fissures of the skin run in converging lines to these two points as centres. Midway, and a little in front of these two points, the rudiment of the regenerated extremity is situated in the form of a raised cutaneous fold or fleshy mass or tubercle, and having on its surface one, two, or more smaller projections or nodules, furnished with minute nails. In the instance given for illustration in the accompanying woodcut (Fig. 2) from a young woman of eighteen years of age, four such imperfect fingers are seen, two of them tipped with nails. In this, as in most other cases, the left arm is the seat of the mutilation, but I have seen the right similarly affected.

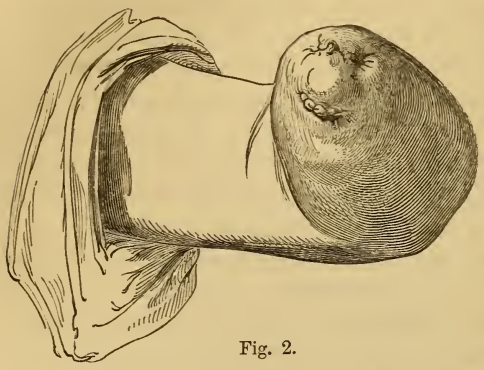

Fig. 2.

The woodcut (Fig. 3) represents the stump of the left forearm of a fœtus of the seventh month, preserved in the Obstetric Museum of the University of Edinburgh. There are five small rudimentary fingers tipped with minute nails in the usual position on the end of the stump. But the case is principally remarkable for the circumstance, that the cicatrisation over the ends of the ulna and radius is not complete. There is an aperture at the end of the radius, through which the end of the bone can be felt when the point of a pin is passed through it. The ulna projects to the cutaneous surface of the stump, and has a small wound or circle of uncovered granulations still around it ; or, in other words, the cicatrix of the stump is as yet incomplete, exactly as in Schaeffer's case already figured.[1]

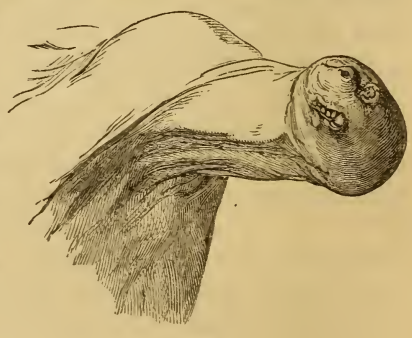

Fig. 3.

[1] See *Dublin Journal of Medical Science*, November 1836, Plate facing p. 221.

VITAL CONTRACTIONS IN THE UMBILICAL ARTERIES AND VEINS.[1]

It is well known that, up to a late period, some physiologists doubted entirely whether the larger arteries of the human body could be made to contract at individual points by stimulants applied at those points. Few or no satisfactory experiments have yet been published, showing that the veins possess the property of contracting locally under local stimuli. But in the umbilical cord the medical practitioner may have daily an opportunity of repeating the following observations and experiments, which prove both of these important physiological facts—viz. the local contraction both of the tubes of arteries and of the tubes of veins, under local stimuli applied to them:—

First. After the child is born, the cord, whether tied or not, is generally sure to become contracted at different points, in consequence of the local contraction at those points of the vessels included within it. In fact, its vessels are thrown, by the irritation of the external atmosphere, and in consequence of their partially empty condition, into tubes consisting of a series of dilatations and contractions, like the peristaltic contractions of the intestines; but with this difference, that the contractions of the vessels are permanent.

Secondly. By pinching a portion of the cord, immediately after the birth of the child, between the nails of the thumb and finger, contractions of the vessels of the cord will be seen to occur at the point irritated. And if this mechanical irritation is confined to individual vessels, as to one of the arteries or to the vein, the effect is equally marked.

Thirdly. If the sheath of the cord be slit up by a pair of scissors or knife, with any of its vessels or arteries exposed, the same experiment may be repeated upon the exposed individual vessels with similar effect—viz. that the mechanical pinching of them will be followed in the course of a short time by a gradual, but very marked, contraction in the irritated part.

Fourthly. Similar local contractions of these vessels occur under the local application to them of irritating chemical substances, or of electricity.

[1] See Proceedings of Edinburgh Obstetrical Society, March 26, 1851, in *Edinburgh Monthly Journal of Medical Science*, May 1851, p. 494.

Fifthly. These contractions do not instantly follow the application of the stimulant, but a short time intervenes before the effect is seen, and the contraction is permanent.

Sixthly. When the experiment is made upon the human umbilical cord, or upon that of the lower animals, where the circulation is still going on in the vessels of the cord, the irritated vessel will sometimes almost entirely close its tube under such local irritation.

Seventhly. These simple experiments, illustrative of the contractility and irritability of the coats of the veins and arteries, are the more remarkable as seen in the umbilical veins and arteries, in consequence of anatomists not being able to detect any nerves in the umbilical cord; although probably elementary nervous tissue may exist in some form in it. For, if it did not exist, then we should have irritability in these vessels existing without nervous influence. The investigation of the existence of veins in any form in the umbilical cord and its vessels thus becomes an interesting microscopical study, in reference to the physiological question of the dependence or independence of the contractility of vessels on the presence of nerves.

PLACENTAL PHTHISIS OR APNŒA,

AS AN INTRA-UTERINE CAUSE OF DEATH AMONG PREMATURE CHILDREN—ITS VARIETIES AND TREATMENT.[1]

Formerly physicians used the word phthisis as a generic term to signify consumption and organic destruction of various kinds; and the viscus which was the immediate seat of decay and death was added to express the nosological seat and species of the malady. Hence arose the terms phthisis pulmonalis, phthisis mesenterica, phthisis hepatica, etc. The infant in utero is liable to perish—1, in consequence of various diseased states of its own body, as peritonitis, dropsy, etc.; and 2, in consequence of different morbid conditions of the placenta. Under the designation of placental phthisis, I shall attempt to point out to you, very briefly, the principal diseased states of the placenta that are apt to lead to the intra-uterine death of the child, and at the same time I will try to state their proper principles of treatment.

Let me premise two observations on this subject. First, That

[1] Part of a Clinical Lecture. See *London and Edinburgh Monthly Journal of Medical Science*, February 1845, p. 119.

in consonance with a very curious and interesting general law in intra-uterine pathology, some of the morbid conditions of the placenta and fœtus are liable to recur in successive pregnancies in the same woman; and, secondly, In actual practice you will find few cases accompanied with greater individual distress and greater family unhappiness, than those in which there is borne by the same mother, two, three, or more premature children, dying regularly in utero, as the seventh or eighth month of utero-gestation recurs.

Occasionally this distressing recurrence of fœtal deaths is the result of disease or malformation in the fœtus itself, and is in a great measure irremediable. Much more frequently, however, such a succession of deaths among premature children is the consequence of placental disease or placental phthisis; and is amenable to proper principles of treatment.

The principal pathological states of the placenta that are liable to produce the successive deaths of a series of premature children in the same mother are the following:—

I. *Congestion and Extravasations of Blood into the Structure of the Placenta.*—In practice it will, I believe, be found that placental hemorrhages or "apoplexies,"—as they have been sometimes termed—forming in the substance, or on the surfaces of the placenta, masses or collections of extravasated blood in various states of change, are lesions much more frequently connected with abortions than with premature labours. They are found connected with the death of the fœtus more often in the earlier than in the later months of utero-gestation. Sometimes, however, they form, and repeatedly in the same mother, the cause of death of the infant from the seventh to the ninth month—a succession of limited hemorrhagic extravasations taking place, till at last the placenta is so extensively diseased and destroyed as to be unable to maintain any longer the life of the child. In such instances I have usually found the placental structure softened and broken up, within and around the more recent and extensive extravasations.

II. *Inflammation of the Placenta* and its various consequences—Hepatisation, Induration, Abscess, etc.,—constitute a second cause of intra-uterine death among premature children. In this morbid affection, the inflammatory action is generally confined to a limited portion of the organ, or to a few lobules, whilst the other parts of the organ are left sound and free. In some cases, however, we find it invading the whole surface of the placenta—an observation which

you will see confirmed by the state of the organ in many cases such as this, which I now show you, where there has been born a secondary fœtus, along with one at the full time—the secondary fœtus, as it is called, being merely a fœtus which had been destroyed as early as probably the fourth or fifth month, by the morbid alteration which had occurred in the structure of the placenta, or portion of the placenta, belonging to it. In inflammatory induration, the morbid deposit and change seems generally to stretch, as shown in this preparation of Mr. Goodsir's, from the maternal surface of the placenta towards the fœtal. The decidual membrane covering the exterior surface of the placenta is occasionally, as here, much thickened by the inflammatory deposit.

III. *Gangrene* of portions of the placenta sometimes, though rarely, produces the recurrent intra-uterine death of the child in the latter months. I have seen several examples of this variety of placental disease. One of the most remarkable was a case which I visited repeatedly some time ago in consultation with Dr. Gibson of Dundee, and where the fœtal heart, as heard by the stethoscope, became irregular and occasionally intermittent for a short time before the birth of the child—an effect which we attributed to the placental disease, as it entirely disappeared when the child assumed an extra-uterine existence. In placental gangrene, the affected parts give forth no gangrenous odour in consequence of the external air not having reached them; but you will find the disease marked, like Laennec's circumscribed gangrene of the lung, by here and there a dark and mortified portion of placental tissue being enclosed in a limited deliquescent mass of bloody and pasty matter. The placental surface at the site of the gangrenous slough is usually depressed and umbilicated in the centre. Generally, the included sloughing fœtal tuft retains its adhesion to the chorial surface of the placenta, and very exactly represents the mortified branch of pulmonary tissue often seen attached by its arterial structure to the interior of circumscribed gangrenous cavities in the lungs. The placental tissue around the circumscribed gangrenes is usually inflamed; very often, also, it is the site of hemorrhagic extravasation. Perhaps, indeed, the gangrene most frequently originates in the compression and death of placental tufts included in apoplectic extravasations, or isolated and obstructed by local inflammatory action.

IV. *General Œdema* or dropsy of the structure of the placenta occasionally destroys the infant in the latter months of utero-gesta-

tion, and is marked by a white, swollen, and serous condition of the organ, without any other appreciable change in its tissues. Sometimes it co-exists, but by no means always, with dropsy and anasarca in the fœtus, and in the whole umbilical cord. I have seen it conjoined, probably as an effect, with inflammatory obstruction in the umbilical vessels, and limited dropsy of the cord. Usually it is diffused throughout the whole placenta, and by interfering with its intra-uterine functions, destroys at last, and sometimes very speedily, the life of the child. It must not be confounded with the white, blanched, and merely anæmic state of the placenta, often observable in cases where the child has died of peritonitis or other fœtal diseases, and been retained in utero for some time subsequently; and it is pathologically very different also from the morbid state which I have next to mention, and which can only be fully made out by microscopic examination, viz.—

V. *Stearoid or Fatty Degeneration of the Placenta.*—In the last century, Hoboken and Haller mentioned the frequency of appearances of fatty matter in the placenta. During the present century, several continental pathologists, as Stein, D'Outrepont, Wilde, Charante, and Brehm, have described cases of fatty degeneration of the placenta; but the importance and frequency of this peculiar change was not recognised till the fatty degeneration of other organs came latterly to be studied by the microscope; and it was first brought under the special attention of the profession in this country by Dr. Barnes of London, in two able papers published in the 34th and 36th volumes of the *Medico-Chirurgical Transactions.* It is a morbid condition found connected with the death of the fœtus, both in the earlier and later months of utero-gestation. Its exact pathological nature, however, has not been accurately determined under all the conditions in which it is found to occur. Dr. Barnes seems to regard this fatty degeneration as, most commonly, a primary morbid state in the placental tissues, or rather in the molecular walls of the fœtal tufts, etc., unpreceded by any other morbid change; and some of its varieties are, there is little doubt, of this character, particularly where the fatty metamorphosis is general and unaccompanied by any other morbid states. But several years ago, and before the appearance of Dr. Barnes' essay, my friend and colleague, Dr. Bennett, carefully examined some specimens of both general and partial fatty degeneration of the placenta with which I furnished him; and in most of these the co-existence of coagulable lymph,

indurations, etc., showed that the fatty molecules were either thrown out as inflammatory exudations, or were formed by inflammatory exudations subsequently degenerating into fat particles, and which in other respects indicated the pre-existence of some degree of placental inflammation. Virchow and Dr. Handfield Jones have each noticed this mode of its production, and Dr. Priestley, who has of late very carefully examined this question in numbers of cases, believes that the so-called fatty degeneration is perhaps most frequently a change connected with a low form of placentitis. In a paper which I published in 1836, on placental inflammation and congestion, I described the chronic inflammatory induration of the placenta as not unfrequently exhibiting "a somewhat stearoid, lardaceous, or fatty-looking structure;" and I suggested also that the white masses like fat and cartilage seen in the placenta by Stein might originate in effused coagula of blood; and I believe that in some cases we have localised fatty deposits in the placenta, resulting from degeneration of the blood thrown out in placental congestion and hemorrhage. Sometimes, further, when the child dies from disease in its own body, and is retained for some time in utero, the placental structure presents an appearance of fatty degeneration, as an effect and not as a cause of the fœtal death. In reference to this morbid change, it is necessary to recollect that the placental structure may appear yellowish-white and fatty in whole or in parts, without there being any true fat globules in it; and to distinguish it accurately, we need the assistance of the microscope.

VI. *Hypertrophy of the Placenta* sometimes leads prematurely to the death of the child in successive pregnancies. When the placenta presents this condition, the organ is greatly enlarged; the divisions between its lobules and maternal surface are very marked and very deep; and the edge of the placenta seems as it were almost to turn to a certain degree over the boundary or circumference of the fœtal surface. One of the preparations on the table is a specimen of this diseased condition, and the patient from whom it was taken had produced six or seven dead-born premature children. Mr. Goodsir has directed his attention particularly to this effect of hypertrophied placenta, and similar observations have been made by some continental accoucheurs. It is difficult to say how the hypertrophy of the placenta destroys the functions of the organ; for in the specimen before you, as in other similar cases, there is no special lesion in the

body of the child itself. Sometimes, however, the child presents dropsical effusions, such as anasarca and ascites. Probably the mutual compression and impaction of the different lobules and parts of the hypertrophied placenta upon each other, are such as to diminish and destroy its action as a respiratory organ, and to impede the circulation through its vast collection of vessels, as effectually as this is produced by the obliteration of these vessels and parts by hemorrhage, inflammation, œdema, or other direct disease.

VII. *Other Morbid Conditions of the Placenta* seem sometimes to lead to a succession of dead premature children in the same mother, as extensive cartilaginous and calcareous degeneration, morbid ramollissement, atrophy, etc.; but their action is less marked and decided than those I have already enumerated. Neither these, nor any of the more truly morbid states of the placenta, are apt, as a general rule, to affect and destroy the child, unless they have invaded and obstructed a large portion of the placental structure and vessels. Indeed, slight and limited degrees of stearoid, cartilaginous, and calcareous degeneration are to be seen here and there in many placentæ at the full time—more as a sign of the early senility of this temporary organ than as a mark of disease—the child's health being, to all appearance, unaffected by them. In the essay I have referred to, I have spoken of these fatty and ossific degenerations of vessels as liable, when they occur earlier in placental life, to predispose to vascular rupture and sanguineous extravasations. Let me only farther add, that I have never seen any instance in which the so-called hydatiginous degeneration of the placenta recurred twice in the same patient, and thus produced a recurrence of fœtal death; nor have I met with true strumous tubercle so extensively diffused in the placenta as to destroy the child.

The *Diagnosis* of the pathological cause of the death of the fœtus, in one or two successive pregnancies, can only be made out, with any precision, by having an opportunity of examining the body of one of the fœtuses and its placenta. In doing so, we may be enabled to observe which of the causes I have mentioned is the source of the calamity, and to direct our treatment accordingly.

Some years ago, when I was engaged in the investigation of Peritonitis in the Fœtus, I more than once asked myself the question, in what good could such an inquiry result? I felt utterly sceptical as to its being of any benefit, except as satisfying pathological curiosity. But often when we enter on a subject of pathological

study, we really know not to what ultimate results it may lead, and therefore never ought to condemn or eschew any pathological investigation, because we do not immediately see any practical advantage to which it may tend. I have latterly become convinced that the study of peritonitis in the fœtus may be made of no small practical utility in the following respect:—

In describing peritonitis in the fœtus, I have stated, when discussing the exciting causes of the disease, that in some cases the mother has been exposed to bodily injury, etc., and after mentioning other probable morbific circumstances, I have added, that it appeared to me highly probable, from the investigations I had then made on this point, that a great proportion of those children of syphilitic mothers that die in the latter months of pregnancy, may be shown to have perished under attacks of peritoneal inflammation. Further observations have led me to conclude that the evidences of peritonitis, in several successive children of the same mother, is a pretty certain test of one or other of the parents, especially the mother, being tainted with syphilis.

The practical deduction in the way of treatment from this observation in the way of diagnosis is evident. It is, I believe, in these cases of successive premature labours, where the child perishes of peritonitis, and in these cases only, that mercury and other anti-syphilitic modes of treatment are alone useful, though these modes of treatment have been supposed to apply to all instances where there is the unfortunate habit of losing the infant in the last months of utero-gestation.

TREATMENT;—ALKALINE SALTS, ETC.;—INDUCTION OF LABOUR.

For the *Treatment* of the cases in which the child dies in consequence of disease, not in its own structures, but in the economy and structure of the *Placenta*, I believe that totally different principles ought to be pursued; and in a large number of instances now, I have had the good fortune to see, in my own practice, and in that of others, these means of treatment followed by the most happy and successful results.

You may easily understand the principles of treatment on which I would advise you to proceed in these last affections, if, in the first instance, you recollect that the two great functions which the placenta performs in the fœtal economy are those—1, of nutrition and, 2, of respiration; or probably we should properly say, that

this organ is the medium of these two functions between the mother and the infant.

When the placenta becomes diseased, it can destroy the infant —provided there is no morbid lesion in the fœtus itself—only by the imperfect manner in which one or both of these functions is performed. Such children, however, as die in connection with diseased placenta, do not appear to perish generally from want of nutrition, because in many instances we find them not more lean and atrophied than healthy children sometimes are at the time of birth; and on opening their bodies you have often abundance of deposit of adipose matter. I believe, for my own part, that they more frequently perish from the diseased placenta not being able to act sufficiently as a *respiratory medium* between them and the mother, especially when the placental disease and obstruction is, as often happens, extensive and acute, or subacute; and that the infant in consequence dies from the morbid condition of the placenta, in the same manner as we should die if our lungs were densely studded with tubercular deposits, or extensively destroyed by inflammatory action. They die from want of respiration rather than want of nutrition—from placental apnœa rather than from placental marasmus. And when once these infants are born, and are sustained by their own pulmonary respiration, they rapidly thrive and grow, proving that there is in reality no disease in their own bodies.

Now the question is—with such an imperfect placenta—or, in other words, with such imperfect fœtal lungs—what means can we possibly adopt in order to make this diseased placenta serve as a sufficient respiratory organ to the infant for a very few weeks longer? For the question is in general a matter only of one, two, or more weeks—that is to say, if we could preserve the child's life during that period from the action of the deleterious influences of which I speak, we should save the child till it was fit to take on an extra-uterine existence.

I have usually—in cases in which, from the history of the previous pregnancies, I knew the tendency to be, as most frequently it is, to some form of Congestion and Inflammation of the Placenta —attempted to prevent these morbid actions from going to any considerable extent, by small venesections, or leechings from time to time; particularly at those periods when the woman would have had her catamenia present, provided she were not in the family way; because it is, I believe, at these periods that she runs most danger—there being, during pregnancy, in many females a monthly

molimen of blood in these parts, though there be no monthly discharge. It is, indeed, at these recurring periods of danger, that rest in the supine position, and freedom from muscular exertion, is specially or alone required. But though we may moderate the hemorrhagic or inflammatory effusions in this way, we can seldom, I believe, entirely prevent them. Hence, our object is to make the diseased placenta as efficient as possible as a respiratory organ; or rather to make the respiratory change in the remaining healthy part as active and intense as possible.

To understand how this may be done, consider for a moment how the fœtus does respire or breathe. Its type of respiration resembles, as I have described it to you at other times, that of fishes. The blood of the fish is sent into the vessels of the gills in order to undergo the respiratory change which is there effected through the oxygen contained in the surrounding water. The blood of the fœtus is sent into the tufts or terminal branches of the fœtal placenta—its gills, in other words—in order to be there exposed to the oxygen contained in the maternal blood, by which these tufts are washed in the cavernous structure of the placenta.

The respiration of the human fœtus is like that of a fish, then, with this difference, that the blood in the gills of the fish is arterialised by the water in which these gills are freely immersed, whilst the blood in the placental tufts of the fœtus is arterialised by the maternal blood in which these tufts are freely immersed. We can influence the vitality of the fish by the quantity of oxygen in the water applied to its gills. I believe we may do the same with the fœtus, by changing the oxygenating power of the maternal blood applied to its tufts.

Then comes the question, By what measures could we render the maternal blood as highly an oxygenating medium as possible, in order that, when it is applied to the fœtal placental tufts, it may make up, by the quality or intensity of the respiratory change which is there produces, for that loss of quantity which is a necessary consequence of a portion of these placental tufts being already destroyed by disease?

I have attempted to do this, and in a great number of cases, apparently with perfect success, by keeping the patients constantly on small doses of alkaline salts, such as chlorate of potass, nitrate of potass, bicarbonate of soda, etc., given several times a day, on an empty stomach, exactly as Dr. Stevens, some years ago, proposed to do for the restoration and arterialisation of the un-arterialised

blood in fever patients. I have most frequently employed chlorate of potass in doses of from ten to thirty grains, taken repeatedly during the day, in solution, and upon an empty stomach. Out of every eight atoms of this salt, as many as six atoms consist of oxygen.

You are aware that the addition of alkaline salts to the blood in this way appears to promote greatly, I had almost said to impart, arterial changes and properties, and that in a way which physiologists and chemists have not yet been able satisfactorily to explain. If you cover a coagulum of newly drawn venous blood with a thin layer of water, the surface of the blood continues to retain its black colour. If you add alkaline salts to the intervening layer of water, the air will very speedily act through this medium so as to render the clot of a red arterial colour. In aquatic respiration, the animal in breathing does not decompose the water, it merely subtracts the oxygen present in it. The same fact, in all probability, holds good in sanguineous respiration—if we may use such a term; and hence the importance of supplying, in the cases we speak of, the maternal blood with a sufficient amount of oxygen.

Patients have repeatedly averred to me, that the use of the salts I have spoken of has a perceptible influence on the strength of the motions of the fœtus—or, in other words, on its muscular power and vigour for the time being; but the observation is liable to so many fallacies on the part of the parent, that, probably, we should not build much upon it. But if these salts act in the manner which I suppose, on the maternal blood, the fœtus, under their use, is placed in a better and purer atmosphere, to use language applied to extra-uterine life; and in this better atmosphere is capable of living onwards for a few weeks longer than it otherwise would have done. I think it might be a matter of some chemical importance to inquire, what special salts would probably be of most use in rendering the mother's blood as highly an arterialising medium as possible, and if the use of iron in any form would increase its power in this or other respects. Further, would the use of chalybeates or other means ever so invigorate the child as to prevent those placental diseases—such as fatty degeneration—which may possibly be connected with want of power in the fœtal economy and circulation? Could any variety of diet or drug render the maternal blood a more nutritious medium for the child, where the placental disease tended to produce intra-uterine death by marasmus or inanition? The subject is quite open

for inquiry, and one in regard to which I know not any very accurate existing data.

In all the series of cases which I have adverted to—that is to say, in cases where children of the same mother have died successively from the effects of different diseased states of the placenta—I believe that the *induction of premature labour* about the seventh or eighth month ought to be a principle of treatment prominently held in view, and frequently had recourse to. This remark especially holds good with regard to all cases and causes of recurrent placental disease; and I think that obstetric authors must add, what no one of them, so far as I know, mentions, the diseased states of the placenta to which I have alluded, as indications for the induction of premature labour, both when they have recurred several times in the same mother, and produced death of the child but a few days or weeks previous to its birth, or even in a first pregnancy, when very distinct symptoms of placental hemorrhage and inflammation have occurred after exposure to injury, and, in addition, the stethoscope shows a state of impending danger to the life of the child. Out of three cases of diseased placenta which have been under my care since the commencement of the present year (1845), in two I induced premature labour successfully, as regards both mother and child, one of the patients having previously lost six, and the other three children. I had thoughts of allowing the third to go on to the full period, but fortunately, natural premature labour came on about the eighth month, and a living child was born. The placenta was so destroyed by inflammatory induration in this last case, that I am sure it could not have served the purpose of a lung to the child for a much longer period. Nature here pointed out strongly, and effected by her own efforts, what ought to be done by art in similar instances. Allow me to add, that the necessity for the immediate induction of premature labour is sometimes shown in these cases by the supervention of lowness and depression, more rarely by the occurrence of irregularity and intermittence in the action of the fœtal heart as heard by the stethoscope. Hence, in watching and treating these cases, auscultation should be constantly used to ascertain the first advent of this sign of danger to the life of the child.

Chlorate of Potass in Placental Disease.[1]

Sir James Simpson said he had used the chlorate of potass in a great number of cases. Sometimes it failed, but all remedies fail at times. He had seen it succeed in many cases where rest had not been combined with it. In one case a lady, who had had a long succession of abortions, took the chlorate, and had two living children afterwards. It failed sometimes, he thought, because it was not given in sufficiently large doses. He usually gave it in ten to twenty grain doses, thrice daily, and it should not be given up. He gave it on account of disease of the placenta, but he believed that it was also a means of arterialising the blood. It was necessary, however, to watch the condition of the child, and, if necessary, bring on premature labour when the fœtus showed symptoms of weakness. He was led to use the chlorate in such cases by the experiments of Davy and Stephens, who pointed out that an alkaline salt, when brought into contact with blood, gave it an arterial appearance. At one time he imagined that its good effects were attributable to the amount of oxygen which the salt contained. He had been repeatedly told by patients that the movements of the child were stronger after each dose. It might be given in an aerated form, by means of the syphon-bottles now in use. Dr. Williams of London uses the chlorate in asthma with marked success.

PLACENTAL HEMORRHAGE.

CHANGES IN THE BLOOD EFFUSED.[2]

In internal placental hemorrhage, or ecchymosis, the blood, after its effusion, undergoes a variety of changes, interesting in themselves, and important in this respect, that a misconception of their nature has, as it appears to me, led pathologists into error in regard to the nature of some of the lesions occasionally observed in this organ. When the blood is poured out from its containing vessels into the substance or cells of the placenta, or between the membranes, it gradually coagulates, and assumes a very dark purple, and sometimes,

[1] See Proceedings of Edinburgh Obstetrical Society, May 12, 1869, in *Edinburgh Medical Journal*, July 1869, p. 85.

[2] Part of an article on Congestion and Inflammation of the Placenta. See *Edinburgh Medical and Surgical Journal*, April 1836, p. 274.

as I have seen it in two preserved specimens,[1] almost a melanotic black colour. After a time, however, it begins to lose this tint, the colouring matter gradually becomes removed, and the coagulum successively assumes a chocolate brown, a reddish or brownish yellow hue, and latterly, if time sufficient is allowed, it presents a pale yellowish white or straw-coloured appearance, the fibrinous portion of the coagulum being then alone left. When these fibrinous and generally firm and indurated masses are divided, they for the most part exhibit internally a dense uniform or homogeneous tissue; but in some cases where the individual mass or coagulum has been formed by several successive effusions of blood occurring at the same point, and probably from the same vessel, its section shows a more or less perfect concentric laminated structure. M. Cruveilhier[2] has represented an ecchymosed placenta, in which the structure of the coagulum appears to be concentrically laminated in this manner, and the more external layers are seen to be losing their colouring matter, while the nucleus of the effusion is composed of darker and more recently effused blood. I have not had an opportunity of observing these changes in specimens of laminated placental coagula, but have had repeated occasion to remark the discoloration of the more common single or homogeneous coagula, proceeding from their circumference to their centre.

In the blood effused in placental hemorrhage, I have been able to trace a change still more advanced than that of its discoloration and conversion into a yellowish straw-coloured fibrinous mass. In four instances I have seen these fibrinous masses in different parts of the same placenta, contracted to a size considerably less than the space which they originally occupied, and consequently appearing, as it were, to be contained in cavities which were only but partially filled by them. This appearance is particularly well seen when the

[1] One of these specimens was in the rich and valuable pathological collection of Mr. Langstaff of London, the other is contained in the Anatomical Museum of the University of Edinburgh, and is thus described in the printed catalogue (p. 236): "Placenta about the fourth month; fœtal surface studded with numerous irregular dark-coloured tubercles resembling melanotic depositions." The dark appearance of the sanguineous coagula in both of these cases is such as might render them at first sight very liable to be confounded with actual melanotic deposits; and in the Edinburgh case this mistake in regard to their true pathological nature might have been the more readily committed, from the small masses of effused blood appearing of a beautiful bluish-black colour, as seen through the membranes covering the fœtal surface of the placenta, owing to these membranes, as semi-transparent whitish media, reflecting the blue rays of light transmitted through them from the dark surfaces of the coagulated masses of blood lying immediately beneath them. [2] *Anatomie Pathol.* liv. xvi. pl. i. fig. 1.

blood has been extravasated towards the fœtal surface of the placenta, or behind the chorion and amnion, and when it has protruded these membranes forwards in the form of the eminences or nipple-like projections already alluded to. In such cases, after the colouring matter of the effused blood has been removed, and time is given for the fibrinous masses which are left, to contract, the folds of the chorion and amnion, which they had carried before them, being inelastic membranes, remain in the position in which they were placed, and present themselves, when the ovum is afterwards examined, in the form of loose half-empty bags or sacs, projecting towards the cavity of the amnion. In one of the four placentæ in which I have observed this contraction, or diminution at least, of the fibrinous coagula, the cavities containing these contracted coagula were filled up with a limpid serum; but in the other three instances, I do not find in my notes any mention of such an effusion.

In no case have I seen the complete removal of the fibrinous coagula from their containing cavities, or any appearance whatever indicative of the organisation of these coagula; and I have to regret not having directed my attention more particularly to the state of the placental tissue immediately surrounding the effusions, and observed the changes which take place in it upon the occurrence of these sanguineous extravasations. In some instances, as in those represented by Cruveilhier,[1] the surrounding placental structure appears to become atrophied and anæmic, after the effusion has occurred; it seems probable that, in other cases, this state and other diseased states of the placental tissue and vessels may precede and indirectly give rise to effusions; but whether a cyst is ever formed around the sanguineous coagula, and under what circumstances it is formed, I have no data to determine, either from observations which I have myself made, or that I can find in the works of others.

I regret, further, not having in my possession any precise facts to determine the period of time which blood effused into the placenta, or between the membranes, requires to undergo the several changes that I have mentioned; but I have seen them all effected in diseased ova which I had every reason to believe were expelled before the fifth and sixth month. The placenta I have formerly alluded to as presenting cavities containing at the same time contracted fibrinous coagula and an effusion of serum, was expelled at the eighth month, but was less in breadth, though of much greater thickness, than placentæ at that period generally are.

[1] *Anatom. Patholog.* livr. xvi. pl. i. figs. 1 and 2, and livr. vi. pl. vi. fig. 2.

PART IV.

PARTURITION.

THE DETERMINING CAUSE OF PARTURITION.[1]

After stating and refuting the various theories that had been suggested on this point, such as the supposed origin of the act of labour in certain states of vital development or physical expansion of the fundus, body, or cervix uteri, in some supposed conditions of the fœtus, liquor amnii, or placenta, etc., Dr. Simpson suggested that the loosening or decadence of the membranes, or membranes and placenta, from the interior of the uterus, constituted the determining cause of parturition; and that this loosening or decadence was itself the result of the effete degeneration of the structure of the decidua towards the full term of pregnancy. Various circumstances in obstetric physiology and pathology were stated in evidence of this view. It was so far also proved, experimentally, for we bring on labour artificially by imitating this process when we separate the membranes with the fingers or catheter, or when we inject tepid water into the cavity of the uterus, or, in other words, between the membranes and interior of the uterus—the latter a plan which Dr. Simpson had followed in twenty or thirty cases.

INFLUENCE OF THE NERVOUS SYSTEM ON THE CONTRACTIONS OF THE UTERUS.[2]

The uterine action is perfectly involuntary. It will occur in states of mania or epilepsy, and in syncope or coma. It has even been seen in the dead mother, in cases where Cæsarean section was performed.

[1] See Proceedings of Edinburgh Obstetrical Society, Session xii., in *Edinburgh Monthly Journal of Medical Science*, September 1854, p. 276.

[2] Part of a Lecture in Sir James Simpson's Course of Midwifery. From notes taken in 1856 by Dr. J. G. S. Coghill, and in 1861 by J. W. B.

But though the action of the uterus is truly involuntary, yet it is liable to be affected by mental influences and emotions, just as the action of our hearts is. The heart will palpitate under excitement, and a person will faint under great fear: so all labour-pains have suddenly ceased from fright. Advantage has sometimes been taken of this law. Women occasionally have a varicose vein in the labium rupturing during labour. The pains have been stopped in such a case by telling the patient that something terrible had happened, and that she would die unless the pains ceased. In another way advantage has been taken of the law. When the pains are languishing and weak, a little encouragement given to the patient will sometimes restore uterine action better than any drug in the pharmacopœia.

Another inquiry has occasioned a good deal of discussion—Are we to consider the ordinary excitants to uterine action as cerebral, or spinal, or ganglionic?

It has been held that the uterine action is dependent on the connection of the uterine nerves with the brain. Brachet supported this opinion from a case of paraplegia in the human female and from experiments on guinea-pigs. He cut the spinal cord in guinea-pigs above the origin of the ovarian nerves at the commencement of parturition. The animals he operated on all died undelivered; and he inferred that the want of uterine action was due to the cutting of the connection with the brain. Deductions from experiments on such small animals do not, however, hold good, because death arises from rupture of the bladder when the cord is divided. I have found that in large animals, such as the pig, where you can avoid this difficulty by drawing off the urine by the catheter, uterine contractions do come on after division of the cord as proposed by Brachet.

It has been averred by Dr. Marshall Hall and Dr. Tyler Smith that the uterine action is a reflex spinal one, connected with a reflex centre in the lower part of the spinal cord, the integrity of which organ is therefore necessary to the occurrence of uterine action. Dr. Hall argued from a case recorded by Ollivier, where a woman had paraplegia from hydatids in the spine high up in the dorsal region. The woman became pregnant, and bore her children without any instrumental assistance. This, Hall said, showed that the uterus was not under the influence of the brain, but under that of the lower part of the spinal cord as a reflex centre.

Many years ago, I removed the spinal cord from the first dorsal

vertebra downwards in several pigs a few days before labour was due. Some of the pigs died, but in others labour came on and progressed regularly. In each case all the fœtuses of the litter were born except the last one. The whole series passed from the uterus into the vagina, one behind the other, and each in its proper membranes. The uterine contractions proceeding from fundus to cervix were sufficient to expel the fœtuses from the uterus; and each fœtus, as it came into the vagina, was thence extruded by the force transmitted from the fœtus behind it. But when the last fœtus came into the vagina it remained there, because there was nothing to transmit to it the uterine expulsive force, while the vagina and abdominal muscles, being under the influence of the spinal nerves, had been rendered powerless by the removal of the cord.

These experiments show plainly that the spinal cord is by no means a *sine quâ non* in the accomplishment of the expulsive function of the uterus, as declared by Drs. Hall and Smith. That the uterus *can* be made to contract by reflex stimulation, we have ample evidence in the effects of the external application of cold, etc., in *post partum* hemorrhage, and in the third stage of labour.

Females have borne children without any remarkable difficulty while suffering from paraplegia—in some the result of direct injury. In a case related by Paget, a woman was attacked with paraplegia in the eighth month, and had neither sensation nor motion below the umbilicus, and no reflex movements could be excited by tickling the feet. Labour came on at the full time, and the fœtus was born without artificial assistance. The woman was quite unconscious that parturition was going on at all; and the fœtus was found dead in the bed. I collected for publication a number of cases of this nature, and in almost all of them parturition was effected without instrumental interference. The case quoted by Brachet probably misled him. In it he thought it necessary to deliver by the forceps, and yet the uterus itself had fully dilated the os.

We conclude, therefore, that though the uterine contractions are no doubt guided or influenced by the brain and spinal cord, they are essentially independent of these organs. The ordinary nervous power is derived neither from the brain nor from the spinal cord, but probably from the ganglionic system of nerves; for although the uterus will contract even when it is cut out of the body, we do not believe that it would contract regularly unless governed by some nervous influence.

Another series of controlling influences is now being investigated

by physiologists. This is the inhibitory system. Irritate certain ganglia, and you stop almost instantaneously the action of the heart. Irritate the splanchnic nerves, and you stop the peristaltic action of the intestines. The uterine nerves are isolated more than any other nerves—perhaps in order that an inhibitory action may be sent along them to stop the pains, perhaps to induce the intense muscular contractions more readily.

SOUND HEARD DURING DETACHMENT AND EXPULSION OF THE PLACENTA.[1]

M. Caillant has described[2] a new stethoscopic sound that he considers indicative of the separation of the placenta. "On applying the stethoscope," he alleges, "to the hypogastric region, after the expulsion of the child, and before the expulsion of the placenta, a sound is heard with each returning uterine contraction, feeble at first, but the intensity of which increases in proportion as the uterine contraction becomes more energetic, and then subsequently diminishes and disappears as the uterine contraction subsides. The sound is composed of a series of rapid small scratching noises, somewhat like those produced by drawing the nails at right angles across the seat of a sofa. It returns with each uterine contraction till the placenta is expelled from the uterus, when it ceases." M. Caillant believes "that it depends, not upon the uterine contractions, but upon the mechanical disunion or separation of the placenta;" and hence he proposes to term the sound "bruit de décollement placentaire."

Dr. Simpson stated the result of M. Caillant's investigations on this supposed stethoscopic indication of the separation of the placenta; but while describing and admitting the sound, he added various reasons for dissenting altogether from the explanation offered of it by M. Caillant. He believed the sound to be produced by the mere physical compression of the placenta, as it is being crushed within and expelled from the uterus; and in various experiments on the subject, he found that it could be artificially imitated with a placenta, after its expulsion from the body, by pressing it through such an aperture as that of the os uteri and os vaginæ.

[1] See Proceedings of Edinburgh Obstetrical Society, January 14, 1852, in *Edinburgh Monthly Journal of Medical Science*, August 1852, p. 168.

[2] See *L'Union Médicale* for 1850, and more lately his *Thèse Inaugurale*, Paris, 1852.

ON THE FREQUENCY OF

FISSURING AND LACERATION OF THE STRUCTURES OF THE PERINEUM AND CERVIX UTERI IN LABOUR.[1]

Dr. Simpson directed the attention of the Society to this important subject; and, as the result of a long series of observations on the matter, he drew the following conclusions:—

First, Fissuring and laceration of the cervix uteri and perineum are not, as is generally conceived, rare lesions during labour; on the contrary, they are very common occurrences, especially in primiparous labours.

Secondly, These lesions are not, as has been often alleged, necessarily the result of mismanagement, but they occur constantly in practice, despite every modification of management, and in cases also in which no kind of management has been adopted.

Thirdly, Evidence of the great frequency of laceration of the anterior structures of the perineum is furnished by—1. Almost every careful autopsy of women after delivery, whether assisted or not assisted during their labour; 2. By the contracted or shortened state in which the perineum is almost always found, when vaginal examinations are made for uterine disease in women who have borne a family; and, 3. By the fissuring or laceration itself being usually traceable, under careful tactile examination, particularly in first labours, when that examination is instituted in the interval of pain, immediately before the passage of the child's head, or after its birth.

Fourthly, Lacerations of the perineum may be often felt beginning in the form of slight roughish rents or fissures upon the mucous surface of the perineum, and these may extend either backwards or forwards; and if they extend forwards, they at last run over the edge of the perineum, and along its cutaneous surface; the mucous and cutaneous structures of the perineum being thus sometimes lacerated, while its middle, cellular, and fascial tissues are comparatively entire, or at least not so deeply and extensively injured.

Fifthly, The proper management and support of the perineum no doubt modifies and diminishes this form of perineal lesion,

[1] See Proceedings of Edinburgh Obstetrical Society, January 22, 1851, in *Edinburgh Monthly Journal of Medical Science*, May 1851, p. 488.

but it fails far more frequently than is generally supposed in entirely preventing it.

Sixthly, The evidence of the frequency of fissuring of the os and lower or vaginal portion of the cervix uteri is the same in character, and consists principally—1. In the frequency with which slight laceration of the edges of the os, and of the mucous and middle coat of the cervix, is detected in autopsies after natural labours, and particularly with first children ; and 2. In the permanent marks of its previous occurrence, as exhibited in those cicatrices and irregularities of the cervix uteri, which anatomists have long empirically, but correctly, laid down as proofs that they, in whose bodies they are found, have been previously mothers.

Seventhly, Fissures and lacerations of the vaginal portion of the cervix uteri not unfrequently occur to a very considerable extent in cases in which the tissues of the cervix have been rendered rigid by previous inflammation, by carcinoma, or by other morbid causes ; and in such cases this fissuring or laceration, if limited to the lower or vaginal portion of the cervix, seems to be accompanied with little or no danger.

ON THE NATURE OF SPURIOUS LABOUR PAINS.[1]

Various opinions have been expressed regarding the nature of spurious labour pains, some believing that they consist of morbid contractions of the abdominal muscles, others of the intestinal canal, and others of the walls of the uterus itself. The actual locality of the pains, and the varying degree of hardness in the uterine tumour during these pains, leave no doubt that the seat of spurious labour pains is in the walls of the uterus itself, and that they are produced, like true labour pains, by contractions in these walls. But the peculiarity of spurious pains seems to consist chiefly in the *direction* of the uterine contractions, and perhaps also to some extent in their local or limited character. In true labour pains the muscular contractions of the uterus pass from above downwards. We see this to be the fact in experiments upon the lower animals ; for when the abdomen is opened in the sow, for example, during active parturition, the wave of peristaltic uterine contraction, constituting a true labour pain, is *seen* to begin at the Fallopian tube, and to pass from thence downwards along the uterine walls to the lower extremity

[1] See Proceedings of Edinburgh Obstetrical Society, Session xviii., in *Edinburgh Medical Journal*, October 1859, p. 371.

of the uterus itself. This phenomenon can be *felt* in the human subject during common labour by spreading out fully the thumb and fingers over the uterine tumour. When this observation is made, it will be found that as each true uterine contraction recurs, there is first a feeling of hardness, and consequently of contraction, felt beneath the finger or thumb placed at the highest point of the uterine tumour; and secondly, this feeling of hardness and consequent contraction rapidly extends downwards in succession to the different fingers placed below. Sometimes a short series of thrills or vibrations in this direction is felt before the full and perfect contraction recurs. The observation can be made in some patients much more readily than in others, and particularly upon women in whom the abdominal parietes are unusually thin. When the same observation is attempted to be made in cases of well-marked spurious pains, it will be found that the contractions, instead of running from above downwards, proceed from below upwards, or from the os towards the fundus uteri. Occasionally, when they are slighter, they will be found lost on the sides of the uterus as they proceed upwards, or even stretch across in a limited form from one point to another. Usually, however, they consist of the peristaltic uterine contraction running in an inverted direction from below upwards, instead of, as in true labour pains, from above downwards.

INDIAN HEMP AS AN OXYTOCIC.[1]

Dr. Simpson stated, that, in the early part of the winter session, he had given Indian hemp (*Cannabis Indica*) in several cases of tedious labour, with the view of ascertaining if it possessed any oxytocic effect, like ergot of rye, in increasing and exciting the parturient action of the uterus. He had been induced to try the effects, if any, of Indian hemp during labour, in consequence of Dr. Churchill[2] stating, that it possessed powers similar to those of ergot of rye in arresting hemorrhage, when dependent upon congested states of the *unimpregnated* uterus. In the few cases of labour in which it was tried, parturient action seemed to be very markedly and directly increased after the exhibition of the hemp; but far more extensive and careful experiments would be required, before a definite opinion could be arrived at, relative to its possession of oxytocic powers, and the amount of those powers.

[1] See Proceedings of Edinburgh Obstetrical Society, Session IX., *in Edinburgh Monthly Journal of Medical Science*, July 1850, p. 91.

[2] Churchill, *Diseases of Women*, 3d edition, p. 113.

COMPLICATION OF LABOUR BY LARGE FIBROUS TUMOURS.

PROPRIETY OF INDUCING PREMATURE LABOUR.[1]

Dr. Simpson stated that it was well known that fibrous tumours were very common organic changes in the unimpregnated uterus. He had seen several cases in which they were still small, and showed themselves in the form of nodulated irregularities on the surface of the pregnant and puerperal uterus. He had seen also a number of instances of pregnancy and parturition complicated with large tumours of this kind; and he mentioned the particulars of the three following cases in consequence of unusual circumstances connected with each.

Case I.—A patient, after being married for 10 or 12 years without any issue, passed two menstrual periods. A very large pelvic tumour, which had long been present, began to increase in size. He then saw her with Mr. Dixon and Dr. Taylor. There was a very large, hard, fibrous tumour of the uterus, and low on the left side and in front, a soft elastic part, having much the character of a dropsical ovary. It is well known that fibrous tumours of the uterus and multilocular dropsy of the ovary sometimes co-exist; but he knew no other kind of cystic collection ever existing along with fibrous uterine tumours. In this case, however, the soft fluctuating part was not the ovary, for it was situated *anteriorly* to the hard uterine tumour, whilst diseased ovaries lie *posteriorly* to the uterus. This led him to suspect pregnancy, improbable as it otherwise was, and to hazard a diagnosis to that effect. It proved correct. The fœtal heart was heard about the fifth month, and pregnancy went on to the full time. During labour, one portion of the tumour filled up so much of the brim of the pelvis, that the child required to be extracted by turning. It was still-born. The mother made a good recovery.

Case II.—In a woman suffering from dysuria, etc., and who had not menstruated for three months, he found the uterus retroverted, and an enormous fibrous tumour in the walls of the organ. The case was at this time seen by Dr. Renton, Dr. Ziegler, and others. The uterus was replaced with difficulty, and some weeks subsequently the fœtus was expelled. About a year afterwards, the same patient again became pregnant and went to the full time. The labour was extremely tedious—a portion of the tumour diminishing the brim of the pelvis—and at last the child was expelled by the spontaneous efforts of the uterus, but with the head greatly compressed and flattened. The mother recovered rapidly. In the unimpregnated state, the fibrous tumour in this instance reached to the umbilicus, and was as large as a uterus at the fifth or sixth month of pregnancy. The uterine cavity was found by the uterine sound to be six inches in length.

Case III.—A patient, pregnant for the first time, who had long been delicate, arrived at the full term of utero-gestation, and after a somewhat tedious labour

[1] See Proceedings of Edinburgh Obstetrical Society, May 12, 1847, *in Edinburgh Monthly Journal of Medical Science*, August 1847, p. 138.

was delivered of a dead child. There was a slight degree of hemorrhage, but it was easily arrested. From the time, however, of delivery onwards, the patient continued to sink—became faint and listless, and then comatose—and died in this state five or six hours subsequently. She seemed never to rally from the "shock" accompanying delivery. Dr. Malcolm saw her with him. On opening the body, they found the uterine parietes thickly studded with fibrous tumours, and counted as many as forty hanging, in a more or less pediculated form, from its external or peritoneal surface; and of all sizes, from an orange downwards. These were easily diagnosticated through the abdominal parietes during her life. The cavity of the uterus contained no collection of blood.

Case IV.—A lady, pregnant for the first time, was supposed by her medical attendant to have an extra-uterine fœtation, from her unusual shape. There was a fibrous tumour projecting from the anterior wall of the uterus. She died of peritonitis on the second week after her confinement. Dr. S. found the fibrous tumour adhering firmly to the peritoneum lining the anterior walls of the abdomen, while its pedicular attachment to the uterus had stretched and lacerated during the involution of the organ after delivery.

In addition, Dr. Simpson alluded to two cases of large fibrous tumours complicating labour, published in the *Dublin Medical Journal*, the one by Dr. Montgomery, the other by Dr. Beatty. In the former, the fibrous tumour, having entered the pelvis, formed such a complete and perfect obstruction to the maternal passages, that the Cæsarean section was required. In Dr. Beatty's case, it was supposed, before the commencement of parturition, that the same proceeding would be necessary; but, in the course of the labour, the tumour was gradually raised out of the pelvis by the uterine contractions, and the child spontaneously expelled.

WHAT PRACTICE SHOULD BE FOLLOWED IN CASES OF LARGE FIBROUS TUMOURS COMPLICATING PREGNANCY?

Dr. Simpson adduced the opinion of Dr. Ashwell, who, in discoursing on this subject, inculcates the propriety of inducing premature labour, in order to evade the danger of inflammation of the pelvic tissues and peritoneum, and the still more hazardous evils of unhealthy softening, suppuration, and ulceration of the tumours themselves. But Dr. Simpson stated that he entertained very serious doubts of the correctness of Dr. Ashwell's observation, that fibrous tumours had a tendency to soften during the latter months more than at any other period of pregnancy; and he disapproved of the induction of premature labour as a general rule of treatment in such cases, believing that the excitement of the uterus by artificial means to the premature expulsion of its contents, would be as likely to induce such anticipated morbid actions, as the supervention and

completion of a natural pregnancy and labour. He believed that the only cases of this kind which demanded the induction of premature labour were those in which the tumour encroached, as in two of the preceding cases, upon the brim or cavity of the pelvis, and thus produced such mechanical contraction of the maternal passages as rendered a natural labour impossible. Where the tumours were, as was usually the fact, abdominal and above the brim, he did not consider premature labour in any way called for, or a practice that ought to be followed.

CASE OF DELIVERY WITHOUT OPERATIVE AID, THROUGH A PELVIS EXTREMELY NARROWED BY MALACOSTEON;

WITH PRACTICAL REMARKS.[1]

Different classifications of the morbid conditions and deformities of the maternal pelvis have been proposed by obstetric pathologists. Some have arranged them in relation to their causes, others in relation to their nature, seats, etc. But the most *practical* classification consists in dividing the morbid states of this part of the skeleton into several grades, according to the actual degree and amount of physical contraction in the pelvic apertures, which is induced by these states; and consequently, according to the kind and modification of measures required to extract through the defective apertures a child arrived at or near the full term of utero-gestation.

Drs. Denman and Ramsbotham, and Professor Paul Dubois, have, for instance, followed this principle of classification in discussing the effects of diseased and deformed conditions of the pelvis upon the process of parturition. Laying aside all pelves of the normal form and standard dimensions, as requiring no accessory aid from art for the transit of an infant through them, these authors have divided all varieties of pelvic contractions into the three following gradations :—

I. Pelves somewhat diminished below the natural standard, but still admitting of the child being expelled through them by nature, or extracted by instruments, safe (such as the forceps and vectis) both to the mother and infant.

II. Pelves contracted to such a degree as not to allow a child,

[1] Read before Medico-Chirurgical Society of Edinburgh, June 2, 1847. See *Edinburgh Monthly Journal of Medical Science*, July 1847, p. 22.

at or near the full term, to pass through their apertures till its head was reduced in size by craniotomy.

III. Pelves so very small as not to admit of the extraction through them of a child even after it was mangled and mutilated by embryulcio, and where that last resort of the obstetric art, Cæsarean section, constituted the only possible mode of delivery.

It is evident that the reference of individual cases of labour to one or other of the preceding degrees of difficulty in the process of delivery, must be often regulated by other circumstances than the mere physical dimensions of the maternal pelvis. The strength and powers of endurance of the patient, the activity of the uterus, and above all the dimensions and compressibility of the infant's head, as modified by its actual volume, and by its state of ossification, the width of its sutures and fontanelles, the separation or not of the bones by previous death and putrefaction, etc., are so many matters forming important points and elements of difference in different instances. But still, however, most of our highest authorities in midwifery have attempted to lay down, in the form of general principles, more or less exact and fixed pelvic admeasurements between the several classes or gradations of pelvic deformity that I have mentioned. In other words, they have endeavoured to reduce to abstract arithmetical formulæ, as it were, the boundaries and limits between morbid states of pelvic contraction, admitting respectively of delivery at or near the full time, *first*, without the necessity of embryulcio; *secondly*, by means of embryulcio; and *thirdly*, where embryulcio is inadequate and insufficient for the purpose.

For the purpose of illustrating these points and statements, I shall collect and throw into a condensed tabular form the opinions of some of our most eminent British accoucheurs on the pelvic dimensions relatively fitted for these different modes of management and delivery. It is necessary, however, to premise one observation in order to understand the figures and formulæ which I shall quote. The apertures of the brim and outlet of the human pelvis are normally of an irregularly ovoid form, and they maintain more or less of this configuration under all kinds of morbid contraction and deformity. Indeed it generally happens, more particularly in cases of rickets and malacosteon, that when either of these pelvic apertures is morbidly contracted in one diameter, it comes to be elongated in the other. One of the diameters, either of the brim or outlet, however, is always contracted; and hence, in speaking of the relative size of different deformed pelves, accoucheurs often note their dimen-

sions by simply stating, as in the first of the following tables, the length of their shortest or narrowest diameter.

Smallest size of pelvis through which a child may pass without mutilation.—In the standard and normally formed pelvis, the narrowest diameter of the brim (the conjugate), and the narrowest diameter of the outlet (the transverse), are each, on an average, about four inches in length. A child may, however, pass through these pelvic openings, though their narrowest diameter be reduced very considerably. The following table shows the opinion of some of the most eminent British accoucheurs on this point.

Smallest Pelvic Diameter admitting of the Passage of a Child without Embryulcio.

$3\frac{1}{4}$	inches—	Joseph Clarke,[1] Burns.[2]
3	„	Denman,[3] Davis,[4] Ramsbotham.[5]
$2\frac{3}{4}$	„	Osborne,[6] Hamilton,[7] Barlow.[8]

[1] "Having examined, by dissection, the bodies of many women who died after tedious and laborious labours, I am enabled to state, with some confidence, that three inches and a quarter from pubis to sacrum is the least diameter through which I have known a full-grown fœtus to pass *entire;* but it was a very putrid fœtus, consequently the head was soft and pliable."—Dr. Clarke, in *Transactions of the Irish College of Physicians*, vol. i. p. 374.

[2] Dr. Burns considers Dr. Clarke "correct when he says that the head cannot pass entire if the diameter be under $3\frac{1}{4}$, and even this will generally require the perforator."—*Principles of Midwifery*, 1843, p. 471.—See also p. 473.

[3] "Should the capacity of the pelvis be reduced under three inches, we have no good reason to expect a living child of its full growth, however small, to pass through it, either naturally or by the assistance of art; though the head of one that is dead, especially if it be putrefied, or one much below the common size, may be pressed through a pelvis of these dimensions, even without artificial assistance. Should the capacity of a pelvis not exceed, according to our judgment, two inches and a half, then the head of a child, unless the contents be evacuated, cannot pass or be extracted through it."—Denman's *Introduction to Midwifery*, pp. 457-58. Edition of 1816.

[4] "Pelves of somewhat less dimensions than those of a standard pelvis may occasionally admit of children being born alive at the full period of gestation. For example, a living child of average size at that period might be born alive, provided the conjugate diameter of the brim of the mother's pelvis was three inches and three quarters, and the head presented in the best possible position. But, if it amounted to no more than three inches, a well-grown child at full period could not be expected to pass without an operation to reduce the bulk of its head."—Davis's *Principles and Practice of Midwifery*, vol. i. p. 25.

[5] "Some practitioners have thought that a pelvis measuring only two inches and three quarters in the conjugate diameter would allow of the head passing whole, provided there was sufficient room laterally. My own conviction, derived from clinical observations, is, that the dimensions I have just mentioned (three

I am not aware that any English writer on midwifery has stated it as practicable that a child could pass, without mutilation, through a pelvic diameter less than that mentioned in the last line of the preceding table, namely, two inches and three-fourths. Instances, however, in which children, at or near the full time, have been expelled by the uterus, or extracted with forceps, through pelves measuring only two inches and a half in their narrowest diameter, have been mentioned by some foreign authors. Solayres, Baudelocque, and Capuron,[9] each advert to cases illustrating the possibility of this occurrence.

In an obliquely deformed pelvis in my museum, the conjugate diameter of the brim is one or two lines below 3 inches; and yet through it a dead full-sized child passed as a head presentation, after a long labour, but without instruments. I extracted a second infant by the feet through the same pelvis. Further, I believe, that when

inches in the conjugate by four in the lateral diameter) are the smallest which will grant the passage to a full-grown fœtus."—Ramsbotham's *Obstetric Medicine and Surgery*, second edition, page 30.

[6] "Whenever the capacity of the pelvis is only two inches and three quarters, or certainly less than three inches," there is, Dr. Osborne conceives, "an utter impossibility for a child of ordinary size, at full time, being born alive by any means, either of nature or art, through so small a pelvis."—Osborne's *Essays on the Practice of Midwifery*, p. 223. At p. 194 he states that, "when the bones approach much nearer than three inches, it is utterly impossible for a living child at full maturity by any means to pass," and embryulcio should be performed early in the labour.

[7] Dr. A. Hamilton, in his Letters to Dr. Osborne, adduces several cases in which delivery took place safely and spontaneously, "where the deformity of the pelvis seemed to be such, that according to your (Dr. O.'s) data, the head of the child should have been opened at the beginning of labour," p. 119. In the first case detailed by Dr. Hamilton, a living child passed, though the pelvic brim was ascertained, by admeasurement after death, to be "sensibly under three inches."—P. 101.

[8] Dr. Barlow, in his *Essays on Surgery and Midwifery*, p. 354, gives the following Synoptical Table of the various degrees of distortion of the pelvis, and their appropriate treatment:—

Degrees of Deformed Pelvis.	Conjugate Diameter of Brim.	Modes of Delivery.
First degree . .	From 4 to 3 or $2\frac{3}{4}$ inches.	Efforts of Nature, or assisted by forceps or lever.
Second degree .	From $2\frac{3}{4}$ to $2\frac{1}{2}$ inches . .	Premature delivery.
Third degree . .	From $2\frac{1}{2}$ to $1\frac{1}{2}$ inches . .	Embryulcio.
Fourth degree	From $1\frac{1}{2}$ to the lowest possible degree of distortion	Cæsarean operation.

[9] Baudelocque's *Midwifery*, Heath's Translation, vol. ii. p. 370. Capuron's *Cours des Accouchemens*, Brussels Edit., p. 221.

the child presents by the feet, and thus the apex, instead of the base, of the cone formed by the head and body of the fœtus, comes first, that it may make its transit *without* embryulcio through a pelvis, the smallness of which would otherwise have necessitated mutilation or the operation of craniotomy. In this way I have, through a pelvis probably not above $2\frac{1}{2}$ inches in its narrowest diameter, extracted a child by the operation of turning, the parietes of the skull becoming compressed and indented to allow of its passage.[1]

Highest Pelvic Dimensions necessitating the performance of the Cæsarean Section.—It is well known that Continental practitioners have sometimes recourse to the Cæsarean section under degrees of pelvic contraction that are not considered by British accoucheurs to demand an operation of such great severity and hazard.

In one of the last and best works upon Midwifery, published in Germany, the following observations occur in reference to the degree of pelvic deformity indicating the Cæsarean operation :—

"When the smallest diameter amounts to only $2\frac{3}{4}$ inches, the termination of labour is possible only by making an artificial passage, or by breaking up the child. The possibility of terminating it in the latter manner ceases whenever the small diameter amounts only to $2\frac{1}{4}$ inches or less, and the Cæsarean section is then the only possible mode of delivery, and that to which we must have recourse in all cases, whether the child be dead or not. If the contracted pelvis measures from $2\frac{1}{4}$ to under 3 inches, then the Cæsarean section is indicated when the child is alive, while, if it is dead, perforation is to be had recourse to."[2]

Jacquemier, the latest French writer on Midwifery, states, that when the pelvis is below two inches in its narrowest diameter, the

[1] I have elsewhere stated the advantages, in deformed pelves, from turning in comparison with embryulcio to be, that—1. It gives the child a chance of life ; 2. It is more safe to the mother, because it can be performed earlier in the labour, and more speedily ; 3. It enables us to adjust and extract the head of the child through the imperfect pelvic brim in the most advantageous form and direction, the head flattening *laterally* under the traction ; 4. The neck of the child, if it be living or only lately dead, is so strong as to allow us to exert such a degree of traction upon the obstructed head, that the sides of the cranium may become very greatly compressed, or even indented under it, and that without necessarily destroying the child ; and, 5. It is a practice which can be followed when proper instruments are not at hand, and the avoidance of instruments is generally desirable when it is possible.

[2] Busch and Moser's *Handbuch der Geburtskunde*, Berlin, 1842, vol. iii. p. 108.

Cæsarean section is the only justifiable mode of delivery, even when the child is dead; and when it varies from two inches to two inches and a half, and the child is alive, the Cæsarean operation should be adopted in preference to embryotomy, not only for the sake of the life of the child—but as, perhaps, not more dangerous to the mother than a protracted and difficult delivery by embryulcio generally proves to be.[1]

So far as I am aware, Velpeau is the only author who has hitherto attempted to collect, in a generalised form, the measurements of the pelvis of patients who have been submitted to the Cæsarean section. He tells us, that out of 80 cases in which the cause for the operation was specified, in 62 cases it was required by contraction of the pelvis, particularly in the antero-posterior diameter of the brim. Thus it was—[2]

1	inch . . .		in	1 case.
1	„	to 1½ inch	in	8
1½	„	to 2 „	in	23
2	„	to 2½ „	in	25
2½	„	to 2¾ „	in	5

In a number of these cases, the Cæsarean operation was adopted under degrees of pelvic contraction, in which delivery by means of embryulcio would have been followed by British practitioners. This remark especially applies to the thirty cases included in the last two lines of the table; and it applies to them the more strongly when we further recollect that the sizes of these pelves in English measurements would have been somewhat more than they appear under French measurements, the French inch being about $\frac{1}{15}$ longer than the English inch.

In choosing, in any case of contracted pelvis, between the alternatives of craniotomy and the Cæsarean section, Continental practitioners generally look upon the life of the child, as well as the probable degree of difficulty and danger likely to ensue to the mother from a painful and protracted delivery by embryulcio, as important points and elements in deciding between these two methods of delivery. In this country, little, or indeed no, attention has hitherto been given to these considerations in forming a practical conclusion on the question. In fact, British accoucheurs have never deemed themselves entitled to have recourse to the Cæsarean section, unless

[1] *Manuel des Accouchemens*, Paris, 1846, vol. ii. p. 162.
[2] *Traité Complet de l'Art des Accouchemens*, vol. ii. p. 458.

the pelvic apertures were so much reduced as to prohibit the practicability of the extraction of the child through them by embryulcio. With them the *propriety* of delivery by the Cæsarean section begins exactly with that degree of pelvic deformity at which the *possibility* of delivery by embryulcio terminates.

Hence, in order to fix and determine the highest limit of pelvic contraction which necessitates the performance of the Cæsarean section, we have merely, in the first instance, to fix and determine the lowest limit of pelvic contraction at which delivery by embryulcio is capable of being effected.

The following table presents, in a condensed form, the opinions of various British and American obstetricians upon this question, namely, the actual degree of pelvic contraction *above* which it is considered still possible to deliver by embryulcio, and *below* which it is deemed proper, and absolutely necessary, to extract the infant by the Cæsarean section.

Smallest Pelvic Diameters admitting of the passage of a Child by Embryulcio.

3½	inches by	2	inches—	Dewees,[1] Bedford,[2] etc.
3	„ by	1¾	„	Burns,[3] Hull,[4] etc.
3	„ by	1½	„	Barlow,[5] Hamilton,[6] etc.

During the last ten or twenty years, various improvements

[1] "By a sufficient diameter I mean, where there is at least two inches in the antero-posterior, and at least three and a half in the transverse; below this, delivery *per vias naturales*, I repeat, I believe to be impossible."—Dewees' *System of Midwifery*, 1837, p. 579.

[2] "I do not believe it is possible to remove a child by embryotomy, when the antero-posterior diameter of the superior strait measures less than two inches, without subjecting the mother to severe hazard, provided the child be of the ordinary size. I am satisfied, that even with the space of 2¼ inches, all the dexterity which the operator can bring to his aid, will be required to protect the mother from serious, if not fatal, injury. I, without hesitation, would prefer the Cæsarean section, if I had certain evidence that the child lived, to any attempt to extract it *per vias naturales*, if the antero-posterior diameter measured less than 2¼ inches."—Dr. Bedford, in his Translation of Chailly's *Midwifery*, note, p. 386.

[3] "The crotchet cannot be used, when the head is of the full size, unless we have a passage through the pelvis and its linings measuring fully an inch and three quarters in the short diameter, and three inches in length; or if the child be premature and soft, an inch and a half broad, and two inches and three quarters long."—Dr. Burns' *Principles of Midwifery*, 1843, p. 508.

[4] "I am of opinion that it still remains to be proved whether a mature fœtus of the ordinary size has ever been extracted, with safety to the mother, through a pelvis, in the superior aperture of which there was not in any point, from the fore

have been proposed in our embryulcio instruments, particularly with the view of rendering that operation more safe and easy in cases of unusual difficulty and deformity. Lest, with such additions and improvements, the preceding table be supposed to misrepresent the existing rules and doctrines of our modern British schools of Midwifery respecting the degree of pelvic contraction necessitating the adoption of the Cæsarean section, I shall cite, in reference to the indications for this operation, the opinions expressed upon the subject in the three last obstetric text-books that have issued respectively from Edinburgh, Dublin, and London.

In his *Introduction to the Study and Practice of Midwifery*, Edinburgh, 1843, Dr. Campbell observes, "Unless we have a clear space of two inches, or nearly so, in the transverse (conjugate), and fully three in the lateral diameter of the brim, embryotomy must be abandoned, as not likely to ensure the safety of the parent."[7]

In his work *On the Theory and Practice of Midwifery*, 1843, Dr. Churchill of Dublin, after an elaborate investigation of the subject, draws the following deduction:—"We may therefore," he observes, "safely conclude, that when, from any cause, the antero-posterior diameter of the upper outlet, or the transverse diameter of the lower, is not more than $1\frac{1}{2}$ inch, there is no possibility of delivery *per vias naturales*, but that we must have recourse to the Cæsarean section."[8]

Dr. Francis Ramsbotham of London, in his *Obstetric Medicine and Surgery*, London, 1844, observes, when speaking of deformity of the pelvis,[9] "I am quite convinced, that unless there be at the brim one inch and three-eighths in the conjugate, by three and a half in the iliac (diameter), or $1\frac{1}{2}$ inches in the conjugate by three in the iliac, it would be useless to attempt delivery *per vias naturales*." And again, when treating of difficult labours, he remarks, "If, upon a measurement conducted with the utmost care, we find there is less space at the brim than three inches and a half laterally, by one

to the hind part, a space equal to $1\frac{11}{12}$ inch."—Dr. Hull's *Defence of the Cæsarean Section*, p. 391.

[5] See Dr. Barlow's Synoptical Table quoted on page 160, from his *Essays on Surgery and Midwifery*, p. 354.

[6] "Whenever the short diameter of the pelvis, either at the brim or at the outlet, will not admit above one ordinary-sized finger, or really falls under one inch and a half, no other means are justifiable for the delivery, if the child be arrived at the full period of gestation, than that tremendous expedient, the Cæsarean operation."—Dr. A. Hamilton's *Letter to Dr. Osborne*, p. 139.

[7] *Introduction*, etc., p. 319. [8] *Midwifery*, p. 314. [9] Ramsbotham, p. 30.

inch and three-eighths in the conjugate diameter; or three inches by one inch and a half; we ought to consider it our duty, however painful and appalling that may be, at once to propose the Cæsarean section as the only means by which it is possible to save the mother's life; and as offering also the sole chance of safety to the child."[1]

Our highest, as well as latest, authorities in British Midwifery seem thus to have fixed upon a degree of pelvic contraction, in which the dimensions varied from $3\frac{1}{2}$ to 3 inches in the long diameter, and from 2 to $1\frac{1}{2}$ in the short diameter, as the lowest limit at which delivery by embryulcio can be performed,[2] and below which it is always and invariably necessary to have recourse to the Cæsarean section, when the child has reached the full time. In the case, which it is my object in this communication to detail, the inferior pelvic aperture of the patient was so deformed and contracted from Malacosteon, that it was considerably less in its dimensions than the lowest limit stated in the preceding table and extracts, as capable of permitting delivery by embryulcio, and yet the mother, after arriving at, if not past, the full time of utero-gestation, was delivered, not only without embryulcio, and without the Cæsarean section, but in fact without instrumental interference of any kind. Further, the child, after its birth, was passed through an unyielding aperture measuring under one inch in its short, and

[1] *Obstetric Medicine and Surgery*, p. 179.

[2] I do not stop to discuss the question, whether, in all cases of great deformity, embryulcio is always *proper* where it is *possible*. The difficulty attendant upon its performance in instances of marked contraction has sometimes been extreme. In a case where the narrowest diameter of the brim was thought to measure *two inches*, Dr. Meigs required many hours to break down the cranium, and afterwards three or four hours' pulling to extract the child with the crotchet. The mother was altogether three or four days in labour.—*Philadelphia Practice of Midwifery*, p. 322. In a woman with a pelvis, the conjugate diameter of which "was estimated at *little more than an inch and a half*," Dr. Hamilton effected delivery by embryulcio. The extraction alone occupied four hours, and "required such an exertion of force, that he was literally obliged from exhaustion to be carried home in a sedan chair."—*Practical Observations*, p. 263. Lately, my friend Professor Murphy extracted a child by embryulcio through a pelvis, the brim of which measured *one and a half inches* in its conjugate, and four and a half in its lateral diameter. The operation required about seven hours' work on the part of Dr. M. The patient was in labour from Tuesday to Friday.—*Lancet* for April 3, 1847. "I question much," observes Dr. Burns, "if extreme cases of embryulcio be not as dangerous to the patient as the Cæsarean operation; certainly they are more painful."—*Midwifery*, p. 501. And he elsewhere adds (p. 509), "I shall not be surprised, if in a few years British practitioners come to resort more frequently, especially in extreme cases, to the Cæsarean section."

two and a half inches in its long diameter; or, in other words, this aperture was fully half-an-inch in all its dimensions *below* the limits supposed to demand the necessity of the Cæsarean section. Before showing the solution of such a seeming obstetric enigma, I shall briefly state the anterior history of the patient.[1]

DETAILS OF THE CASE OF MALACOSTEON, AND INFERENCES FROM IT.

Mrs. D——, Cupar in Fife, now 34 years of age, was in early life regarded as a robust and large child. She became a dressmaker in Edinburgh at fourteen years of age. The sedentary habits of this profession betimes rendered her catamenia very irregular, and brought on so much general delicacy of health that she was advised to forego the occupation. She went to Cupar, and lived there with a relation. In 1837, when about 24 years of age, she married. Two years subsequently to that event she began to complain of pains in the back and sides, and stiffness about the knee-joints. From this attack she never recovered so fully as to be able to walk without support, and continued to suffer much with shifting pains. In 1840 she fell, while walking with a staff across her room, and after this the pains in the limbs were for a considerable time far more severe, and the lameness greatly increased. Since recovering, she has been able to walk out of doors with the assistance of crutches. But various bones of the trunk and extremities have become shortened and deformed under the effects of the malacosteon. The spine is bent backwards and outwards in the form of a bow, with the ribs and sternum correspondingly displaced. Some of the phalanges of the fingers are bent; the right thigh-bone is curved forward into a semicircular shape. And from being a handsome and somewhat tall woman, she has shrunk down, during the course of the last seven or eight years, into a deformed dwarf-like figure, measuring about four feet in height.

From the time of her marriage up to last June (1846) Mrs. D. had never become pregnant. Some time, however, during the course of June—but she is not certain at what precise period of the month—the catamenia appeared for the last time. She was delivered on the 28th of April, or ten months after the last menstruation.

For some time after pregnancy commenced, Mrs. D. feared that the swelling and increased size of the abdomen were the result of

[1] For these particulars I am much indebted to the kindness of Mr. Wiseman of Cupar, the patient's medical attendant.

dropsy, and did not watch her own feelings so as to be aware of the period of quickening. At last, however, the motion of the child, etc., became so unequivocal, that she applied to Mr. Wiseman to attend her in her approaching confinement.

On examining into the condition of the pelvis, Mr. Wiseman at once found that its outlet was extremely contracted, but the pregnancy was already so far advanced as to preclude, under such a degree of deformity, the idea of delivery by the induction of abortion or premature labour. Besides, all attempts to touch the os uteri proved ineffectual, so that none of the ordinary means of arresting pregnancy, and exciting uterine action, could have been put into practice.

Early in March I visited Mrs. D., with Mr. Wiseman, Dr. Graham, and Dr. Grace. She was quite incapable of moving or turning in bed without assistance. The uterine tumour was high, and pressed over to the right side. On applying my stethoscope to it, I readily detected the usual rapid pulsations of the fœtal heart. I found fully borne out the correct description which had previously been given me of the excessive deformity and contraction of the pelvis. The sacrum was straight above, so that its promontory did not probably encroach on the brim; but its inferior extremity was strongly and anormally curved forwards. In front, the walls of the pelvis felt doubled or collapsed together; and the outlet, which was the only part that could be very accurately examined, was exceedingly deformed and diminished in size. The transverse diameter was particularly contracted. I found it impossible to introduce two fingers between the tuberosities of the ischia. Hence this diameter of the outlet was evidently under an inch. Posteriorly, or opposite the sacro-sciatic ligaments, there was transversely more space, but the strong anterior curvature of the coccyx and lower end of the sacrum seemed to curtail the conjugate diameter of the opening, and to prevent the probability of its admitting, when fully dilated, more than three, or, at most, four fingers, even in this direction.

Under these circumstances, with a living child advanced to the eighth month, and a pelvic outlet so extremely contracted, I had no hesitation in coming to the same conclusion as the patient's medical advisers had all previously done, namely, that the Cæsarean section was the only practicable mode of delivery. I was aware that Barlow, Conradi, Sprengel, and others, had seen and published cases of mollities ossium, in which the softened and still flexible pelvic bones had bent and yielded during labour so as to permit the pass-

age of the child without operative interference; but in Mrs. D. the osseous tissue appeared far too firm to permit us to indulge even in this faint hope. Nature, however, provided, and was perhaps already preparing, for the mother a mode of delivery that was still more safe and easy.

Having agreed to operate in case the Cæsarean section was required, I anxiously waited in the daily expectation of being called to Mrs. D. At last, on the morning of the 28th of April, I received from Mr. Wiseman a note, dated the previous night, intimating that our patient had begun to complain of labour pains—that the os uteri could be felt projected low down into the vagina—that it was not opened more than two or three lines—and that the presenting part of the child could not yet be detected. With some professional friends who had agreed to accompany me, I forthwith proceeded to Cupar, a distance of about thirty miles. On arriving there, we were surprised to hear that the patient was delivered, and our surprise was only increased by learning that no kind of instrumental aid had been required. A visit, however, to the room in which the child was, readily solved the apparent riddle.

The infant had been dead for some time in utero. It looked nearly the natural length, and as it lay extended on the table, it measured 18½ inches from the crown of the head to the heels. But its limbs and body were thin, lank, and atrophied; and its weight was only three pounds two ounces. Its head appeared very large and disproportionate in size, and indeed had been considered hydrocephalic. This seemingly increased volume, however, was not the consequence of effusion, but the result of putrefaction. The encephalon was in a dissolved and semi-fluid state; and as the head lay on the table, it was extended and flattened out laterally and superiorly, as if it consisted of a bag or bladder, half filled with liquid or semi-liquid contents; and such in fact it really was. For all the bones of the arch of the cranium were separated from their attachments, and floated about in the dissolved and liquified cerebral matter. The bones of the basis of the skull were also loosened, and more or less separated from each other—a rarer occurrence. On handling the vertex, the first piece of bone which I touched was the orbital portion of one of the ossa frontis. The symphyses even of the inferior, as well as of the superior, maxillary bones, were loosened, and admitted of free motion. And the component parts of the head and face were so easily displaced and compressed that, on placing one of my fingers in the lower occipital region behind,

and another on the nose or cheek in front, I found that, without any considerable degree of exertion, the two could be made to approximate to within a few lines of each other. Yet the skin of the scalp and face was continuous and entire, the epidermis only being separated at different parts. The chest and abdomen of the child seemed quite soft and pliable, though not in so disintegrated a state as the head.

Thus far the macerated and diffluent state of the fœtus appeared to afford an easy explanation of the possibility of its transit through the very contracted pelvic outlet of the mother. But I was anxious to have more full and complete proof that the fœtus, even in this state, was capable of passing through an aperture, of dimensions so small as we knew the pelvis to present in the case of Mrs. D. In order to obtain this proof, I got oblong openings of two or three different sizes cut in plates of white iron. The smallest of these perforations, however, though only $3\frac{1}{2}$ inches long by $\frac{7}{8}$ broad, proved unnecessarily large for the experiment. We diminished it by filling it up at one end with strong, thick, and perfectly unyielding sole leather, so that the whole opening measured only $2\frac{3}{8}$ inches in its largest, by $\frac{7}{8}$ of an inch in its shortest diameter; and yet through this aperture, of which the accompanying woodcut gives the exact outline,[1] the child was pulled without any great degree of force or difficulty. In dragging the infant through this aperture, no particular resistance was met with from the bones of the head and face; but the size of the liver impeded its transit for a minute or two, as the lower part of the thorax was passing through the metallic opening. Dr. Graham, Dr. Ziegler, Dr. Weir, Mr. Wiseman, etc., witnessed these experiments with me; and, if our limited time had allowed us to remain longer in Cupar, and to have got another plate perforated, probably we should have found the child capable of passing through an aperture one or two lines smaller in some of its dimensions.

Fig. 4.

The placenta had been preserved. It was small and atrophic,

[1] The perforated iron plate and superadded piece of leather are preserved in the Obstetric Museum of the University.

and contained scattered through it a number of those white tubercles, as they are sometimes improperly termed, which we so often see connected with, and causing, marasmus and death of the fœtus in utero. Some of these tubercles or fibrinous deposits were of the size of hazel-nuts, or larger.

The history of the delivery had been this.—Slight labour pains had come on during the afternoon of the 27th. She was seen in the course of the evening by Drs. Graham and Grace and Mr. Wiseman, who found the os uteri beginning to dilate, but the pains were not severe, and the husband and attendants of Mrs. D. all went to bed. About one o'clock in the morning of the 28th, Mr. Wiseman was raised, the waters having escaped about an hour previously, and the uterine contractions having become strong, and bearing down. When Mr. Wiseman reached the house of the patient, he found the soft scalp of the child already bulging through the external parts. Some detached bones, included in the portion of scalp that had passed, allowed him to obtain a firm hold of the protruded portion of the head, and thus enabled him to use some extractive force. By thus assisting the effects of the pains, the child was entirely born about half-an-hour after Mr. Wiseman's arrival. The mother has made a very good recovery, and declares that "having a child is nothing."

There are no sufficient data to determine at what precise time the infant died. Milk had been discharging from the nipples for three or four weeks before delivery; but whether the child had perished about that period, it is impossible to say. Mrs. D. deceived herself with the idea that she felt it living and moving up to the time of delivery.

The preceding case is, I believe, unique in the annals of midwifery. It will perhaps, therefore, require no apology if I add one or two brief inferences which the history and details of it appear to suggest.

1. It has taught me, and is, I conceive, calculated to teach others, a strong lesson of caution in regard to our *prognosis*, under apparently even the most desperate circumstances. In such rare forms of complication as this, we must depend for our prognosis, etc., upon the anterior observations and recorded facts of others. Here all such records led me to expect a very different result, and offered no hope whatever of such a fortunate termination as actually occurred.

2. The case affords a new and striking illustration of the just and well-known remark of Dr. Denman, that "the resources of nature in everything which relates to parturition are infinite, and constantly exerted for the preservation of both the parent and child; yet, when the two objects are incompatible, the life of the child is almost uniformly yielded to that of the parent."[1] And the mode and mechanism by which nature brought about this unexpected result in the present instance are highly worthy of special notice. For, *first*, she set up a diseased condition of the placenta, which prevented the full and proper nourishment of the fœtus, and thus restrained as far as possible its development and growth. *Secondly*, she carried this state of marasmus to such a degree, as at last proved slowly fatal to the child, without superinducing that expulsive action which generally soon follows the death of the infant. *Thirdly*, the dead infant was subsequently retained for so long a time in utero, that not only the bones of the cranium, but the bones of the basis of the skull and face were loosened and separated from each other, and the head and other parts of the body thus rendered readily and easily compressible.[2] And, *lastly*, the emaciated, dead, and highly

[1] *Practice of Midwifery*, p. 415.

[2] No individual case in midwifery has given rise to so much discussion as that of Elizabeth Sherwood. Her pelvis was estimated by Dr. Osborne as below the lowest standard which I have given in a preceding page, as capable of allowing of the passage of a child by embryulcio, being only about ¾ of an inch from the sacrum to the pubis; and yet he delivered her successfully by craniotomy after working and pulling three hours with the crotchet. Many authors have stated that Dr. Osborne must undoubtedly have under-measured the pelvis of Sherwood; —and Drs. Hull, Burns, Hamilton, etc, have denounced the operation of embryulcio as "impracticable" if Dr. Osborne's measurements were at all true and accurate. Dr. Campbell, for instance, observes, "It would be idle to enter largely on the refutation of this extraordinary case, since Dr. Osborne's narrative of what he thought he had accomplished is irreconcilable with common sense; for how could the base of the cranium, which is 1½ inch in thickness, and nearly three in breadth, be brought through the aperture which he describes. A fair estimate," Dr. Campbell continues, "of the utter impossibility of effecting it may be afforded by the simple experiment of forming in a plate of hard wood, an opening, in shape and size exactly corresponding to the pelvis of Sherwood, and attempting to force through it the base simply, divested of the other portions of the skull." —*Midwifery*, pp. 317 and 318. In the case of Mrs. D., I obtained the corroborative evidence afforded by the very experiment which Dr. Campbell here properly suggests; and I have already stated the facility with which the child was passed through the perforated plate. In Sherwood's case there was, I believe, the same reason for the practicability of delivery, for the fœtus seems to have been in the same putrid and decomposed state as Mrs. D.'s child, and perhaps the bones of the face and basis of the cranium were in a similar way loosened and compressible. "The whole body of the fœtus was," to quote Dr. Osborne's own words

putrefied infant, after being thus reduced to this diffluent and compressible mass, and now capable of being moulded to the contracted apertures of the pelvis, was ultimately and without difficulty expelled through them by the supervention of natural uterine contractions. Each stage and step in this mechanism was necessary for the success of that which followed it, and the imperfection or omission of any one of them would probably have entirely subverted and prevented the very fortunate and very unlooked-for result that occurred from the combination of the whole.

3. Does the mode in which the delivery was effected in this instance by nature, suggest any measures of practice which, under similar complications, we could induce and imitate by art? I put this question, because, in the greater deformities of the pelvis, all the standard operations and means which we employ for delivery are in fact imitations of processes and operations which nature herself employs under the same conditions. When the pelvis has been much contracted, abortion has occasionally come on in the earlier months and saved the mother; or premature labour has supervened about the seventh month, and saved both the parent and child. These natural processes we imitate successfully in the artificial induction of abortion and premature labour. If, in morbid contraction and deformity of the pelvis, the pregnancy goes on to the full time, nature is still sometimes capable of delivering the mother by other and various measures. Occasionally, during labour, the symphysis pubis has been rent asunder under the intense and wedge-like pressure of the infant's head; or the uterus has been lacerated, or, as has happened now in two recorded cases, both the uterus and abdominal parietes have simultaneously ruptured and allowed the escape of the child through this double opening; or the bones of the child's cranium have become deeply compressed and fractured, so as at last to allow the reduced head to pass; or the same has been effected by the infant dying, putrefying, and at last its scalp and sutures

"in the most putrid and almost dissolved state."—See p. 101 of his *Essays*.—But, besides, the brim of the pelvis in Sherwood was in reality not so small as the measurement of its conjugate diameter would seem to indicate. During delivery the os uteri was pulled by Dr. Osborne over to the right side, or to the *space* intervening between the line of the conjugate diameter and the right ilium. *Here* there was an oblong aperture 3 inches long (as measured from the ilium to the symphysis pubis), and $1\frac{3}{4}$ inch broad; and hence in fact an aperture as great as Drs. Hamilton, Burns, Churchill, Ramsbotham, etc., deem necessary for the performance of embryulcio; and greater than that through which we pulled Mrs. D.'s child.—See drawing of the brim of Sherwood's pelvis, in Dr. Hull's *Defence of the Cæsarean Section*, pl. v. fig. 1.

bursting, so as to produce the necessary diminution in the size and dimensions of the encephalon. These several operations of nature are all imitated by art in the respective operations of symphyseotomy, the Cæsarean section, cephalotripsy, and craniotomy. And while art thus adopts the operative principles of nature, she attempts to improve both upon their facility and safety, by selecting an earlier and hence less dangerous period for their performance; and by making the required openings and lesions by cutting instruments, instead of submitting to the chance of their being made by nature by means simply of an enormous and hazardous expenditure of muscular effort and compression on her part.

But, I repeat, does the mechanism of the delivery in Mrs. D.'s case suggest any principles for imitation? Let us consider the answer, as it might be varied by the *date* of the pregnancy of the mother; and according as she had reached the periods, *first*, of artificial abortion; or, *secondly*, of premature labour; or, *thirdly*, had already advanced to the full time.

The case shows that through an opening of very small dimensions a child may pass, provided it be in a very compressible state. So far it evidently suggests that the induction of *abortion* at the fourth or fifth month, when the head of the fœtus is still small, soft, and very easily reducible, would, as long ago proposed by Cooper, etc., succeed in such extreme deformities in saving the mother from many of the dangers accompanying delivery at a later period of utero-gestation. I have stated above, that Mrs. D. applied to Mr. Wiseman at a time when it was already considered too late to have recourse either to artificial abortion or premature labour; and further, the high position of the os would probably have rendered either of them impracticable.

The induction of *premature labour* at or about the seventh month would not, of course, have sufficed with a pelvis of such small dimensions, unless we could modify the operation so as both to produce the death of the child and *retain* it in utero, for the purpose of allowing its structures to become dissolved and disintegrated before labour at last supervened. Now we have no known means of inducing that diseased state of the placenta which produced the attendant emaciation and death, in the case of Mrs. D.'s infant; nor am I acquainted with any measures which would destroy the life of the child in the later months, without superinducing labour. The retention, however, in utero of the infant, and its maceration or putrefaction, would be as necessary for success as its death, under

such great degrees of contraction. And the result shows, that when the pelvis is much deformed, and labour with a *dead* child is threatened, or the infant is destroyed by craniotomy, the longer we can retain it in utero without danger to the mother, and the more it thus becomes putrefied and disintegrated, the easier will its ultimate expulsion or extraction prove.

Lastly, suppose a patient with a very diminished and deformed pelvis to have arrived at the *full time* of utero-gestation, does Mrs. D.'s case suggest any new principles or modifications of treatment for the delivery of the mother? I believe that, under these circumstances, our conduct and practice should be, in a great degree, regulated by the state of the child. If it be *alive*, as ascertained by auscultation, etc., and the pelvis is as small as in Mrs. D.'s case, or even half-an-inch larger in its measurements, then I am decidedly of opinion that it is our duty to perform the Cæsarean section. We have two human lives committed to our charge, and it is our duty to try to preserve both, provided we can attain that object without subjecting the mother to a degree of danger, much greater than she would otherwise undergo. Let us take, however, the other alternative, and suppose the child already *dead*. With this complication most British accoucheurs would attempt delivery by craniotomy, if the dimensions of the pelvis permitted at all of the possibility of it. And the case of Mrs. D. seems to me to suggest one means of rendering it thus possible, under states of contraction, where it is at present properly regarded as in the highest degree unsafe or totally impracticable. The grand obstacle to the delivery of the child by embryulcio, in greatly contracted pelves, arises from our want of means to reduce the size, or alter the shape and compressibility, of the bones of the base of the skull and face. In Mrs. D.'s child, nature had disintegrated and separated these bones, had removed in fact this obstacle, and thus rendered the delivery not only possible but easy. Could we imitate or induce this same fortunate result by artificial means? All our present means of reducing the size of the fœtal head in embryulcio, are limited to the destruction of the arch of the skull. I am not aware that with any proposed form of osteotomist[1] we are capable of cutting or dis-

[1] The Kephalepsalis of Dr. Campbell appears to me to be an instrument preferable to, and more powerful than, any of the forms of osteotomist invented by Dr. Davis or others. Yet, as we have already seen, Dr. Campbell believes embryulcio to be impracticable, even with its assistance, in a pelvis less than 3 by 2 inches. It is almost unnecessary to add, that the French operation of Cephalo-

integrating the base of the cranium or face, when the pelvis is diminished to $1\frac{1}{4}$ or $1\frac{1}{2}$ inch in its shortest diameter. Yet, probably, some modification of mechanical means would give us the power of effecting this desirable object. The common perforator might enable us to loosen and break up the bones of the base, in some cases, in the same way as with it we break up the arch, of the skull. The disjunction or fracture of these bones, without their removal, migh prove sufficient to permit the required degree of compressibility and alteration of shape. Or the common bone-forceps of the surgeon, or a modification of such powerful pliers as are used in dividing the needles in the operation for harelip, etc., might answer. At all events, the object seems anything but a hopeless one, more especially when we call to recollection that modern surgeons are now provided with mechanical means, which sometimes enable them to seize, break up, and extract from the cavity of the bladder, large and solid stones—and that too, through a canal relatively so small and elongated as the male urethra.

The subsequent history of the patient, whose case is described in the preceding pages, was as follows:—

Mrs. D. remained in much the same state of health for several years after her delivery. The deformity of the skeleton did not seem to advance in any degree during that period, and was considered by herself and friends to be quite arrested in its progress. In 1853 she again became pregnant. But she did not inform her medical attendant, Mr. Wiseman, of her state, nor consult him in any way in regard to it; and he was not called to see her till she had been a considerable time in labour, under the charge of a midwife. Parturition supervened at the supposed full term of gestation. She was not aware of the exact date of the last catamenia; but she had felt the movements of the child for five months before labour commenced. Mrs. Adam, the midwife, was called to

tripsy is founded on the idea of crushing and compressing the bones of the base, as well as of the circle, of the cranium. It is used by some of the leading accoucheurs of Paris, instead of craniotomy, particularly in cases where the child is dead, and the pelvis below the dimensions that would admit the use of the forceps. But the instrument with which the operation is performed—the Cephalotribe—is of such enormous dimensions, its blade being of solid iron, $1\frac{1}{4}$ inch wide, the whole above 2 feet long and several pounds in weight, that it could not of course be applied in cases where the pelvis was contracted to any extreme degree.

Mrs. D.'s assistance about ten or eleven o'clock on Wednesday, the 21st of June 1854. Mr. Wiseman was first sent for next morning, about four o'clock. The patient continued in labour during that and the two subsequent days. On Friday morning a summons was sent for me to Edinburgh; but in consequence of some mal-arrangement at the telegraph office, it was not delivered; and a second message by railway arrived that evening. Accompanied by my friends Drs. Malcolm and Storer, I reached Cupar early next morning. The patient was by this time very weak and exhausted, and, indeed, almost moribund; but the child's heart could be still heard beating, though feebly. I performed the Cæsarean section, more with the hope of still saving the child, than of being of any possible use to the mother. No special difficulty occurred in the operation, except from an artery in the divided walls of the uterus bleeding profusely by a per-saltum stream, till it was arrested after a time by torsion. The patient died about two hours subsequently. The child, the care of which was entrusted to Dr. Graham, breathed only once or twice after birth; but its heart continued to pulsate slightly for ten or fifteen minutes. It seemed to die from cerebral effusion.

A post-mortem examination was permitted. Mr. Wiseman has kindly furnished me with the following notes of it:—

"The entire length of the body was found to be 4 feet 4 inches. The left femur was curved forward, rendering that limb shorter by an inch and a half than the right limb. The measurement from the superior anterior spinous process to the heel, being in the one case 31 inches, in the other 32½. The ribs projected much forward from the point of the insertion of the clavicles, which bones were greatly twisted, and the sides of the chest were thrown down upon the bones of the pelvis. This arched line, from the upper end of the sternum to the scrobiculus cordis, measured 6 inches. From the junction of the clavicles to the superior anterior spinous process of the ilium, 10½ inches.

"Posteriorly, the line of the spine from the end of the os coccygis to the nape of the neck, measured 20 inches. The spine projected to a considerable extent at the upper part of the back, and again to a smaller extent in the sacral region.

"We found the length of the incision made in the operation to be 6 inches; and, the stitches being removed, about 4 ounces of coagulated blood were found in the abdomen.

"The distance between the two superior and anterior spinous

processes of the ilia was nearly 10 inches, or more precisely 9⅝. The brim of the pelvis was triangular, or cordate, in form; the transverse and antero-posterior diameters measuring each nearly 3¾ inches at their widest points. The capacity of the brim, however, was not in proportion to the above measurement, from the great projection forward of the sacrum and pubis, and the collapse inwards of the sides of the ilia. The outlet of the pelvis was far more contracted. From the symphysis pubis to the coccyx, it measured 3 inches, but the transverse diameter, or distance between the tuberosities of the ischia, was only half-an-inch. The depth of the pelvis at the symphysis pubis was two inches."

ON THE

SPONTANEOUS EXPULSION AND ARTIFICIAL EXTRACTION OF THE PLACENTA BEFORE THE CHILD,

IN PLACENTAL PRESENTATIONS.

I.[1]

Section I.—Dangers of Placental Presentations: Opinions of Authors: Statistical Evidence of the Fatality of these Presentations.

All obstetric authors seem to agree on this point, that there is no one complication in midwifery attended with more anxiety to the practitioner, and few, if any, with more real danger to the patient, than cases of unavoidable hemorrhage from presentation of the placenta.[2]

"Placental presentations," says Dr. F. Ramsbotham, "are always

[1] See *London and Edinburgh Monthly Journal of Medical Science*, March 1845, p. 169. The substance of the following memoir was, on the 4th of December 1844, laid before the Medico-Chirurgical Society of Edinburgh.—See *Edinburgh Monthly Journal*, February 1845, pp. 158-161.

[2] "During the last months of gestation, and at the commencement of labour," observes Dr. Churchill, "patients are exposed to *two* forms of hemorrhage, differing in their causes, but depending upon the *situation* of the placenta. The first has been called 'accidental hemorrhage,' because it arises from a partial and accidental separation of the placenta, which occupies its *usual* situation; and the second is justly termed 'unavoidable hemorrhage,' because the placenta being placed partially or wholly over the os uteri, the dilatation of this will *unavoidably* separate the after-birth, and give rise to hemorrhage."—*Theory and Practice of Midwifery*, p. 383. Our investigations in the present memoir refer to the last of these two forms of uterine hemorrhage.

fraught with extreme peril."[1] "The attachment of the placenta," observes Dr. Collins,[2] "to the mouth of the womb, is one of the most dangerous complications to be met with in midwifery." "There are few dangers," to quote the words of Dr. Edward Rigby,[3] "connected with the practice of midwifery, which are more deservedly dreaded, and which are wont to come more unexpectedly, both to the patient as well as to the practitioner, than that species of hemorrhage which occurs in cases where the placenta is implanted, either centrally or partially, over the os uteri." "It is," says Dr. Dewees,[4] "confessed on all hands, that no accident attendant on conception, is equally menacing, as unavoidable hemorrhage; and it also emphatically declares to the physician, that much depends on him, that it shall not be very often fatal. It is one," he adds, "of those extraordinary cases, in which nature does less for the preservation of the individual than in almost any other." "That form of hemorrhage," remarks Madame Lachapelle,[5] "which depends upon the implantation of the placenta upon the internal orifice of the uterus, is one of the most dangerous accidents to which pregnant women are exposed." "It is perhaps," long ago observed Deleurye,[6] "of all labours, that in which the mother and the child run the greatest danger." Still earlier, Lamotte states,[7] that "amongst all the accidents of child-birth, there is not any one more perilous (*il n'y en a point un plus perileux*) than that in which the after-birth presents before the child."

The actual results of practice fully bear out the observations which I have selected from the preceding authors upon the danger of unavoidable hemorrhage from placental presentation. My friend Dr. Churchill, in his late excellent work upon the *Theory and Practice of Midwifery*, has collected from different sources the records of 174 cases of this complication. Amongst these 174 cases, 48 proved fatal to the mothers; or nearly one in every three of them died. I have attempted to make a still more extensive analysis of recorded cases of placenta prævia, or placental presentation, and the consequences of this complication as bearing on the life of the mother. The following Table[8] shows the results of the inquiry:—

[1] *Obstetric Medicine and Surgery*, 2d edition, p. 391.

[2] *Practical Observations on Midwifery*, p. 90.

[3] *System of Midwifery*, p. 248. [4] *Midwifery*, p. 390.

[5] *Pratique des Accouchemens*, tom. iv. p. 362.

[6] *Traité Complet des Accouchemens*, p. 404. [7] *Traité des Accouchemens*, p. 36.

[8] Printed as published in the *Lancet* for September 1847, p. 276, in a corrected form, and with additional data furnished by Dr. Ramsbotham, Dr. Wilson, etc. See also *Lancet* for 1847, p. 517, in reference to the correctness of the data.

TABLE OF MATERNAL MORTALITY IN PLACENTAL PRESENTATIONS.

Reporters.	No. of Cases.	Mothers Lost.
Mauriceau[1] . . .	18	3
Portal[2]	14	1
Giffard[3]	19	5
Smellie[4]	18	7
Rigby[5]	42	10
Clarke[6] and Collins[7] .	16	4
Busch[8]	13	2
Schweighauser[9] . .	65	16
Lachapelle[10] . . .	21	10
J. Ramsbotham[11] . .	129	41
F. Ramsbotham[12] . .	189	49
Lever[13]	34	8
Lee[14]	46	14
Wilson[15]	30	10
Total . .	654	180

From the above Table, it thus appears that out of 654 cases of placental presentations which are collected into it, the result was fatal to the mother in 180 instances, or, in other words, 1 *in every* $3\frac{6}{10}$ *of the mothers perished in connection with this complication.*

[1] *Observations sur la Grossesse et les Accouchemens*, vol. ii. pp. 8, 48, etc. etc. ; and *Edinburgh Medical and Surgical Journal*, vol. li. pp. 383-84.

[2] *La Pratique des Accouchemens*, 1785, Observ. ii.-xxix., etc. etc.

[3] *Cases in Midwifery*, pp. 22, 36, 38, 52, 87, etc. etc.

[4] *Collection of Cases*, etc., vol. ii. pp. 307-315 ; and vol. iii. pp. 141-178. I have, with Dr. Churchill and others, here and in a subsequent table, marked all those cases of Dr. Smellie's as recoveries, where an opposite result is not directly stated. The context seems to warrant this.

[5] *An Essay on Uterine Hemorrhage*, 6th edition, p. 262.

[6] *Transactions of King and Queen's College of Physicians*, vol. i. p. 380.

[7] *Practical Observations in Midwifery*, p. 96. The returns of Drs. Clarke and Collins are classed together, as both coming from the Dublin Lying-in Hospital.

[8] Forbes' *British and Foreign Review*, vol. v. p. 587.

[9] *La Pratique des Accouchemens*, p. 224.

[10] *Pratique des Accouchemens*, tom. ii. pp. 415-461.

[11] *Practical Observations in Midwifery*, part ii. pp. 195-233, and MS. Notes.

[12] *Principles of Obstetric Medicine and Surgery*, 2d edition, pp. 395-96. Dr. F. Ramsbotham kindly drew out for this memoir, in 1847, a list of all the cases of placenta prævia attended by his father and himself, with their results, as given in the above table.

[13] *Guy's Hospital Reports*, vol. vi. p. 66.

[14] *Lectures on the Theory and Practice of Midwifery*, p. 371.

[15] From MS. notes of Dr. Wilson, formerly Lecturer on Midwifery, and deservedly one of the most highly esteemed and distinguished obstetric practitioners in Glasgow. Many of the fatal cases were instances which Dr. W. saw in consultation.

The dangers of placental presentations to the mother may appear stronger to some minds if I state them in other terms. Two of the most fatal epidemics of modern times, are yellow fever and Indian or malignant cholera. In the well-known yellow fever of Gibraltar of 1828, the mortality among those attacked was nearly 1 in $4\frac{1}{2}$.[1] In 1832-33, about 1 in $3\frac{1}{2}$ of those affected in England with the epidemic cholera, died.[2] Hence those mothers who are the subjects of placental presentations are submitted to as great peril of life from this obstetric complication, as they would be if seized with yellow fever or malignant cholera. Further, the operation of lithotomy is generally regarded as one of the most formidable in surgery, and is calculated to be fatal in the proportion of 1 in every 6 or 8 subjected to it.[3] The occurrence of placenta prævia is twice as dangerous and fatal as the operation of lithotomy—1 in every 3 perishing under the first, and 1 in every 6 or 8 perishing under the last.

Looking at these results, it will, we believe, be readily conceded, that any attempt—such as is the professed object of the present memoir—to diminish this fearful maternal mortality in placenta prævia, is entitled at least to the consideration of the obstetric profession, even should it fail to be so fortunate as to secure their concurrence and conviction.

Section II.—Recognised Principles of Treatment:—1. Evacuation of the Liquor Amnii: and, 2. Delivery by Turning. Proposal of a Third Principle: The Complete Separation of the Placenta; Grounds for Proposing it: Illustrative Cases.

Hitherto, two great principles of treatment—if we leave out the minor details of management—may be said to have been pursued by obstetric practitioners in the treatment of placental presentations.

[1] Out of 5383 persons attacked, 1183 died.—See *Researches on the Yellow Fever of Gibraltar*, by Dr. Louis of Paris; Boston, 1839, p. 259.

[2] Dr. Merriman has calculated, from official returns, that 49,594 individuals were affected with epidemic cholera in England, and that 14,807 of them died, giving the proportion in the text. In Scotland and Ireland the mortality was greater. See *Medico-Chirurgical Transactions*, vol. xxvii. p. 416.

[3] "The average mortality from lithotomy, on all hands, appears at present to be about 1 in 8."—Dr. Willis' *Urinary Diseases*, 1838, p. 347. Mr. Inman has calculated the mortality from lithotomy to be 1 in every $7\frac{3}{4}$ cases, 765 patients having died out of 5900 operations which he had collected.—See *Lancet* for October 5, 1844.

And the two modes of practice I allude to are supposed by many to be applicable to two different stages or degrees of the complication They consist of the two following measures :—

1. *The Evacuation of the Liquor Amnii.*

In some cases of placenta prævia, and under some circumstances, the artificial evacuation of the liquor amnii is recommended to be had recourse to, and thus the same treatment is followed for "unavoidable" hemorrhage, as is followed by most practitioners in instances of "accidental" hemorrhage. This mode of practice has been especially applied of late to cases in which the presentation of the placenta was only *partial*, and where, consequently, a portion of the membranes was within reach, and to instances in which the hemorrhage was comparatively slight in its degree and effects. About a century and a half ago, the same treatment seems to have been employed also by some practitioners, in instances in which the placenta presented completely over the os uteri, the placental structure being perforated artificially by the finger or an instrument, in order to permit the liquor amnii to escape. After recommending that, in placenta prævia, the membranes should be pierced, or the fingers thrust through the placenta, "that at last it be perforated, and instead of the constant flux of blood which appeared before, the humours will presently flow out," Daventer,[1] writing about the year 1700, adds, "some penetrate the secundines with a *hair needle*,[2] which I do not approve of if it can be done with the fingers, because the infant is easily hurt." Under some conditions in placenta prævia, Deleurye[3] recommends the piercing of the placenta with a trocar, in order to allow the liquor amnii to be drained off. Baudelocque[4] speaks of the same practice as probably useful in instances of complete or central presentation of the placenta, when the cervix will not allow of turning; and in later years the same plan has been again proposed by the elder Dr. Ramsbotham,[5] and successfully put in practice by Gendrin[6] of Paris.

[1] *The Art of Midwifery Improved*, London, 1715, pp. 153-54.

[2] "Placentam vel secundinam *acu crinali* perfodiunt," to quote the original Latin. See p. 138 of the second edition of Daventer's *Novum Lumen*, etc. Leyden, 1733. The first edition was published in 1701.

[3] *Traité des Accouchemens*, Paris, 1777, p. 369.

[4] *System of Midwifery*, translated by Heath, vol. ii. p. 38.

[5] *Practical Observations*, part ii. p. 189.

[6] *Traité Philos. de Médecine Pratique*, tom. ii. p. 548.

2. *The Delivery of the Child by Turning.*

In the generality of cases of unavoidable hemorrhage from placental presentation, the practice which is adopted consists in forcing the delivery, by passing the hand through the os uteri up to the feet of the infant, and extracting the child by the operation of podalic turning. This last mode of practice is the one universally followed when the hemorrhage is very severe, and whether the artificial evacuation of the liquor amnii has preceded it or not, and it is the plan of treatment usually pursued where the presentation of the placenta over the os uteri is central or entire. By some accoucheurs indeed, as Drs. Burns and Hamilton, Baudelocque, Capuron, and others, the forcible delivery of the woman by the operation of turning is the *only* mode of treatment that is thought advisable under any circumstances in connection with *placenta prævia.*

It is, according to Plenck, "nullo remedio sed solâ extractione fœtûs curanda."[1] "All the best practical writers are," says Dr. Merriman, "unanimous on this point, that the case of placenta adhering over the cervix uteri is not to be trusted to nature. In all cases of attachment of the placenta over the os uteri, it is incumbent upon the accoucheur to make up his mind to the operation of turning the child, and bringing it into the world by the feet."[2] "This is a case," Dr. Conquest remarks,[3] "in which we ought never to confide in the powers of nature, because expulsatory uterine efforts only augment the peril of the patient; and therefore the hand must be either bored through the substance, or, what is better, passed by the edge, of the placenta, and the child turned." "It is completely established," to quote the words of Dr. Dewees,[4] "that the only chance the woman has for life, is by a well-timed and well-conducted delivery, in every case of placental presentation." "When hemorrhage," says Dr. Denman,[5] "from this cause (placental presentation) comes on, though all women without proper assistance would not die, none are free from danger till they are delivered. As there is a very doubtful chance of the delivery by the pains of labour, and as experience has fully proved the frequent insufficiency of all other methods intended to suppress the hemorrhage, and how

[1] *Elementa Artis Obstetricæ*, 1781, p. 133.
[2] *Synopsis, etc., of Difficult Parturition*, 1826, pp. 126, 127.
[3] *Outlines of Midwifery*, p. 157.
[4] *System of Midwifery*, p. 394.
[5] *Introduction to Midwifery*, p. 527.

little reliance ought to be placed on them, though they are always to be tried; it is a practice established by high and multiplied authority, and sanctioned by success, to deliver women by art, in all cases of dangerous hemorrhage, without confiding in the resources of the constitution. This practice is no longer a matter of partial opinion, on the propriety of which we may think ourselves *at liberty* to debate; it has for near two centuries met the consent and approbation of every practitioner of judgment and reputation in this and many other countries. See Mauriceau and almost every succeeding writer."

Cases of Placenta Prævia not unfrequently occur in practice in which neither of the two preceding plans can be successfully adopted—where the artificial evacuation of the liquor amnii is insufficient to moderate the hemorrhage to a safe degree—and where forced delivery by turning is inapplicable or extremely dangerous if adopted. In these and other cases, I would beg to submit to my obstetric brethren an additional principle of treatment, viz.—

3. *The Complete Separation, and, if necessary, Extraction of the Placenta before the Child.*

I shall first state the grounds on which I venture to found the propriety of this proposed addition to the treatment of the very anxious and very dangerous cases of which we speak.

Obstetric pathologists seem unanimous in the opinion that all the more formidable varieties of hemorrhage which occur from the uterus in the latter months of utero-gestation, or the earlier periods of labour, are attributable to the separation of the vascular connections between the placenta and the interior of the uterus, and the escape of blood from the vessels which are laid open in consequence of this separation.

Paradoxical as it may appear, there are sufficient grounds and facts for believing, that when the placenta is separated slightly and partially, the chance of fatal hemorrhage to the mother is greater than when the disunion of the organ is entire and complete. Various authors have detailed cases in which the death of the mother speedily took place, though the portion of the placenta separated from the uterus was exceedingly small. Thus Dr. Hamilton mentions that in several cases which had fallen under his observa-

tion, and where he was called too late to afford proper assistance, it was discovered that the fatal hemorrhage had proceeded from the separation of "a very small portion of the placenta." In one instance of fatal hemorrhage between the seventh and eighth month of utero-gestation, he found on dissection that "the area of the separated placenta was less than a square inch."[1]

On the other hand, I believe I have collected a sufficient number of data to prove that, when the disjunction of the placenta from the uterus is *perfect* and *complete*, the degree of maternal hemorrhage that occurs is in general exceedingly slight and trifling, or it is altogether arrested. The details of a few cases may illustrate and impress the fact which I wish to point out.

Case I.—*Placenta expelled upwards of three hours before the child; no hemorrhage in the interval; child removed by decapitation and extraction.*—In 1840 I was requested by my friend Dr. Graham Weir to see a patient at about the fifth month of pregnancy, who had been attacked with very severe hemorrhage. It was her third or fourth pregnancy. After the flooding had continued for some time, the placenta was expelled. *From the time of its expulsion the hemorrhage ceascd.* The shoulder and neck of the infant were presenting over the os uteri. The os uteri was so contracted, and the whole organ so small, as to prevent the possibility of the introduction of the hand for the operation of turning. At my suggestion, Dr. Weir severed the neck of the infant. Its body was then easily extracted by pulling at the presenting arm; and its head was immediately afterwards expelled by the unassisted action of the uterus. From three to four hours elapsed between the protrusion of the placenta and the complete delivery of the woman, yet during that time she lost little or no blood, and her recovery was speedy and perfect.[2]

Case II.—*Placenta expelled about two hours before the child; elbow of the child presenting.*—In 1841 I was requested by Dr. Lewins of Leith to visit a case of complicated unavoidable hemorrhage. I saw the patient shortly after nine o'clock in the morning. Labour pains had come on about four, and a considerable degree of hemorrhage had accompanied them. Shortly after seven o'clock, Dr. Lewins, on visiting the patient, found the placenta expelled through the os uteri. When I saw the woman, nearly two hours afterwards, the placental mass was lying between her thighs, and attached to her by the umbilical cord. She was weak from the hemorrhage that had occurred previous to the expulsion of the placenta, but from the time that organ had been extruded, *the flooding had almost entirely ceased.* I found the elbow of the child presenting; and as the os uteri was well dilated, it was easy to bring down a lower extremity, and terminate the labour. The patient recovered without a bad symptom.[3]

Case III.—*Placenta expelled some minutes before the child; no intervening hemorrhage; child expelled by natural pains, and revived.*—For the details of this case I am indebted to Dr. Dewar of Dunfermline, and shall give the circum-

[1] *Practical Observations*, 2d edition, p. 314.
[2] See subsequent General Table, No. 17. [3] Table, No. 21.

stances in his own graphic words. "Some blood," he says, "had been lost as nearly as we could calculate at what would have been the seventh and eighth menstrual periods, and several times between the eighth and ninth months, and that in spite of an entire cessation from all exercise. Labour took place at the full time, and, as was dreaded, was accompanied with severe hemorrhage from the beginning. When I saw her, about an hour after pain had begun, the orifice of the uterus was pretty well dilated, and a soft spongy mass, apparently the centre of the placenta, protruded from it. There was no time for interference, for almost instantly a strong pain forcibly expelled the whole of the placenta from the vagina. *To my surprise, the flooding ceased.* Pains continued active, and the child was born in less than ten minutes. After a little time the infant revived, and the mother recovered well, though considerably exhausted."[1]

Case IV.—*Great hemorrhage, and expulsion of the placenta under strong uterine action; child extracted by turning some hours afterwards.*—Mrs. H., during her second pregnancy, her first child having been premature, had a slight flooding about the seventh month. When in the eighth month, labour commenced early on the morning of the 18th of May, with slight pains, and sanguineous discharge. These continued more or less severely till the evening of the 19th, when, as Mrs. H. was resting upon her knees and elbows, an immense gush took place, along with an unusually strong pain. Immediately afterwards, on being laid down, the placenta was found protruding from the external parts. The attendant midwife immediately sent off to a distance of several miles for two medical gentlemen, who arrived about half-past one o'clock on the morning of the 20th. In the meantime, the hemorrhage was inconsiderable. The medical men attempted to turn, and deliver the child, but encountered great difficulties in doing so, the head having remained fixed in the pelvis for an hour or two after the body was born. The recovery was tedious. The patient, now one of the most respected and intelligent midwives in Edinburgh, has had three children since the above period.[2]

Case V.—*Unavoidable hemorrhage terminated by the expulsion of the placenta; child allowed to be delivered by the natural pains.*—"About half-past six on the morning of April 29th, 1818, a messenger," says Dr. Ramsbotham, "arrived at my house, sent by two medical gentlemen, with a note to this purport: 'We are in attendance upon Mrs. H., whose situation is involved in great uncertainty, from a placental presentation; the bleeding is going on pretty actively, and we wish for your immediate opinion.' On my arrival at the house of the lady, about eight, I was told by one of the gentlemen, 'that since the note was sent off some strong expulsive pains had come on, which had expelled the placenta through the external parts before the head of the child, and that it was lying upon the bed. That before this occurrence the hemorrhage had been violent, yet not to that extent as apparently to endanger the woman's life; but that, since the appearance of the placenta *the flooding had very much abated.*' During our conversation on this unusual occurrence, the gentleman more immediately in attendance, who, at my arrival, was in the bedroom of his patient, came down stairs and reported, 'that the head was presenting at the brim of the pelvis, with a hand down by its side; that there was no want of uterine action; *that the flooding had ceased;* and that his patient did not seem much exhausted.' An appeal was now made to my opinion, as to the further management of the case, to which I replied, 'that as the flooding, the most dangerous symptom, had abated, as the labour-pains continued active, and especially as the woman's strength kept up, there did not

[1] Table, No. 48. [2] *Ibid.* No. 2.

appear to be an immediate necessity for a recourse to any means for hastening delivery; watch your patient for a short time, and wait the result; if the flooding should return, or any dangerous symptom make its appearance, let us know.' In about half-an-hour after this interview, the gentleman returned with a cheerful countenance, and stated that the child was expelled without further loss of blood, and that his patient was promising to do extremely well," etc.[1]

Case VI.—*Placenta gradually coming down, during the labour, into the os uteri, and being at last expelled four hours before the child; with no intermediate hemorrhage.*—Mrs. C., in the eighth month of her fourth pregnancy, was taken in labour on Sunday evening, about nine o'clock. Mr. Chapman was called to her about twelve o'clock. He was informed that the membranes had been ruptured for some time. The os uteri was dilated to the size of a crown-piece, and the head presenting, but still very high. The pains were very strong and regular. On a second examination, an edge of the placenta was discovered "beginning to protrude through the os uteri," with a hemorrhage which was trifling, but increased upon the return of the pains, though still so inconsiderable as not to be directly alarming. Mr. C. did not hence conceive himself justified in proceeding to immediate delivery. But, as upon every return of pain the placenta became more and more protruded through the os uteri, without the head advancing, the advice of another practitioner was sought. Previous, however, to his arrival, the pains proved so strong that the os uteri became dilated, and the placenta was completely expelled through the os externum, about three o'clock on Monday morning, with very little hemorrhage. From this moment the pain entirely ceased. The other practitioner did not arrive until five o'clock. "*There had not,*" to use Mr. Chapman's own words, "*been the least hemorrhage since the expulsion of the placenta.*" It was now resolved to turn the child; but after two prolonged attempts the feet could not be seized, the uterus being spasmodically contracted in the longitudinal direction, and the circular fibres appearing to act without the consent of the longitudinal. "During the whole of this time the hemorrhage had not in the least increased." Twelve drops of the tincture of opium were now administered. In a very short time the patient became easy and comfortable; and in less than half-an-hour the natural pains returned, and speedily expelled the child, with the head and arm presenting. Nothing remarkable happened in the convalescence, except a trifling attack of phlegmasia dolens, an affection from which the patient had likewise suffered after her first labour.[2]

Case VII.—*Placental and shoulder presentation; placenta expelled; turning.*—The patient, in the sixth month of her fifteenth pregnancy, was attacked with hemorrhage that was alarming in extent, but not so great in quantity as to produce syncope. "I saw her," Dr. Ramsbotham writes, "two hours after the first attack of flooding. The placenta was now lying completely in the vagina, *and there was not the least hemorrhage.* The membranes were ruptured. The shoulder of the child presented. The cervix uteri was unexpanded and rigid, and it was consequently impossible to get my whole hand into the uterine cavity, but I succeeded in reaching the ham of the infant, and was by this means enabled to turn and deliver." "An hour or more" elapsed between the complete detachment of the placenta and the birth of the child. It had been dead for some time. The mother recovered perfectly.[3]

Case VIII.—*Placental and arm presentation; placenta in the vagina, and without hemorrhage, for about eight hours before the child was born.*—In a woman

[1] Table, No. 36. [2] *Ibid.* No. 14. [3] *Ibid.* No. 27.

who had completed the full time of pregnancy, Dr. Macaulay found the placenta expelled from the uterus, and lying in the vagina. She had been flooding previously, but it had ceased about eight o'clock on the morning of the 13th of February 1816. The late distinguished Dr. Kellie of Leith visited the patient with him. The woman peremptorily refused to allow Drs. Macaulay and Kellie to deliver her. About four o'clock P.M. the pains quickened, the placenta was expelled from the vagina, and about half-an-hour afterwards an anencephalous infant followed. The child was in every way well shaped, except as regarded the head. "Dr Kellie told me," to quote the note which Dr. Macaulay made at the time, "that the head was the smallest he had ever seen, and remarked, that though it was an axiom in midwifery, that when the placenta was implanted over the os uteri, hemorrhage *must* continue till the uterus was emptied, *yet here it stopped as soon as the placenta came down.*"[1]

Section III.—Table of 141 Cases of Expulsion and Extraction of the Placenta before the Child: Arrangement and Divisions of the Table.

I have been able to find upon record fifty-six cases of Placental Presentation in which the placental mass was expelled before the child, as in the preceding seven or eight instances which I have brought forward in the last section. Through the kindness of my professional friends, I have collated the notes of seventy-four additional unpublished instances in which the same accident happened. As the entire detail of more instances than those I have already stated, would at the present stage of our inquiries only swell out our pages, without any corresponding advantage, I have deemed it better to throw the principal facts connected with all the cases which I have collated into a tabular form, in order to present thus, in a more concise manner, their general features and individual peculiarities. It is only necessary to premise, in regard to the following table, that under the heads referring to the degree of hemorrhage before and after the separation of the placenta, and the time or interval between the expulsion of the placenta and expulsion of the child, I have as nearly as possible adhered to the identical words used by the reporters themselves, in each case. The table commences with those instances in which the interval between the birth of the placenta and the birth of the child was longest, and progressively proceeds to those in which this interval became shorter and shorter, till at last we come to a set of cases in which the placenta and infant were expelled simultaneously.

For the purpose of assisting in some subsequent deductions, the table is split up into the four following divisions:—

[1] Table, No. 10.

GENERAL TABULAR VIEW OF ONE HUNDRED AND OR EXTRACTION OF THE PLACENTA

FIRST

CASES IN WHICH A CONSIDERABLE INTERVAL (FROM 10 HOURS TO 10 MINUTES)

	By whom observed or reported.	No. of the pregnancy.	Period of delivery.	Degree of hemorrhage *before* the entire separation of the placenta.	Degree of hemorrhage *after* the entire separation of the placenta.	Mode of delivery of the child.
1	Dr. Collins, Dublin	..	9th mon.	..	..	..
2	J. Y. Simpson	2d	8th ,,	Excessive	Inconsiderable	Turning
3	Mr. Cripps, Liverpool	3d	9th ,,	A good deal	None	Turning
4	Dr. Merriman, London	..	..	..	..	By natural pains
5	Mr. Hewitt, Earlston	..	..	Little or none	..	By natural pains
6	Dr. J. Ramsbotham	..	..	..	Little	Turning
7	Dr. Newman, Glasgow	..	9th mon.	Great	None	By natural pains
8	Baudelocque	..	..	..	..	..
9	Walter	..	..	Almost none (not 2 oz. in all)	Almost none	Turning
10	Dr. Macaulay, Edinburgh	Not 1st	Full time	Great	None	By natural pains
11	Velpeau	..	..	None	None	..
12	Mr. Perfect	..	..	Slight	Slight	Turning
13	Mr. Small, Wemyss	7th	7th mon.	Very great	Very trifling	By natural pains
14	Mr. Chapman	4th	8th ,,	Slight	Very slight	By natural pains
15	Dr. Radford, Manchester	9th	9th ,,	Very great	Quite arrested	Long Forceps
16	Mr. Sidebottom, do.	7th	9th ,,	Profuse	Ceased	By natural pains
17	J. Y. Simpson	3d or 4th	5th ,,	Great	None	Decapitation
18	Dr. Radford, Manchester	7th	9th ,,	Very considerable	Quite arrested	By natural pains
19	Dr. Ingleby, Birmingham	Several	9th ,,	Not very great	None	Turning
20	Mr. Bailey, Thetford	..	7th ,,	Profuse	..	Turning
21	J. Y. Simpson	..	7th ,,	Not great	None	Turning
22	J. Y. Simpson	6th	7th & 8th	Very great	None	By natural pains
23	Dr. Todd, Colinsburgh	Several	8th ,,	Not alarming	..	..
24	Dr. Fraser, Aberdeen	1st	9th ,,	Moderate	Scarcely any	Turning
25	Dr. Radford, Manchester	3d	9th ,,	Very profuse	Quite arrested	By natural pains
26	Dr. Gardiner, Glasgow	1st	9th ,,	Very great	None	By natural pains
27	Dr. F. Ramsbotham	15th	6th ,,	Alarming	Not the least	Turning
28	Professor Gendrin	2d	8½ mons.	None during labour	None	By natural pains
29	Mr. Wood, Manchester	8th	9th ,,	Very great	Quite stopped	By natural pains
30	Dr. Campbell, Edinburgh	1st	8th ,,	Little	..	..
31	Dr. Gardiner, Dundee	1st	7th ,,	Moderate	Very slight	By natural pains
32	Mr. Hay, Glasgow	1st	9th ,,	Excessive	Very little	Naturally
33	Dr. Ingleby, Birmingham	9th	5th ,,	Great	None	Turning
34	Dr. Irvine, Pitlochrie	10th	9th ,,	None	None	Extraction
35	Dr. Young, Glasgow	1st	6th & 7th	Very great	None	By natural pains
36	Dr. John Ramsbotham	..	..	Violent	Soon ceased	By natural pains
37	Dr. Todd, Colinsburgh	Several	..	Not great	..	..
38	Dr. Radford, Manchester	5th	8th mon.	Very great	Quite arrested	By natural pains
39	Dr. Wharrie, Hamilton	9th	8th to 9th	Considerable	None	By natural pains
40	Mr. Dorrington, Manchester	7th	9th mon.	Great	None	By natural pains
41	Dr. Forbes, Kennoway	4th	9th ,,	Very great	None of any consequence	Forceps
42	Dr. Millar, Kilmarnock	1st	7th ,,	Great, 6 lbs. in 2 dys.	Slight oozing.	Turning

REMARKS.

4. See details under Section VI.
5. Mr. H. was sent for on account of the expulsion of the placenta, nothing unusual having occurred beforehand. He was some miles distant, but arrived just before the child was born. There was little or no hemorrhage.
8. "A midwife had extracted the placenta some hours before, and had been unable to turn the child, whose arm presented with the head. The uterus was strongly contracted on the child, and discharged but a few drops of blood."
9. See details under Section VI.
10. See Case under Section II.
11. See Section V.
14. "In this case, very little more blood was lost than women usually do, when the placenta is expelled in the usual manner."
15. "In this case, the expulsatory efforts were energetic to the time of accomplishing the separation and expulsion of the placenta, when they ceased. No hemorrhage occurring afterwards, it was deemed advisable to wait the 4 hours."
18. "The hemorrhage being arrested, there was no need to interfere, further than to adopt those measures which are necessary to support the vital powers."
19. "The placenta had been expelled nearly through the os externum. A large quantity—nine-tenths, I should say—had been cut off with a pair of scissors. I saw the case very soon afterwards; passed my hand, and delivered the child, and then removed the small bit of placenta and membranes."

FORTY-ONE CASES IN WHICH THE EXPULSION PRECEDED THE BIRTH OF THE CHILD.

DIVISION.

ELAPSED BETWEEN THE EXPULSION OF THE PLACENTA AND THE BIRTH OF THE CHILD.

Time between birth of placenta and birth of child.	Presentation of the child.	Results.		Where reported, or by whom communicated.
		To mother.	To child.	
Evening before	Foot	Recovered	Dead	Practical Observations, p. 192.
Several hours	..	do.	do.	See Case of Mrs. H. in Section II.
10 hours	Arm	do.	do.	Communicated by Mr. Cripps.
Many hours	..	Died	..	Synopsis, p. 126.
A considerable time	..	Recovered	..	Communicated by Dr. Tait, Edinburgh.
A considerable time	Head	do.	..	Practical Observations, vol. ii. p. 232.
Several hours	Head	do.	Dead	Communicated by Dr. Smith, Glasgow.
Some hours	Arm & head	do.	..	Baudelocque, vol. ii. p. 37.
Probably some hours	Crossbirth	Died	Dead	De Morbis Peritonei, p. 33.
About 8 hours	Arm & head	Recovered	do.	Communicated by Dr. Macaulay.
Above 6 hours	..	do.	do.	Traité des Accouchemens, i. p. 356.
5 hours	Abdomen	do.	Alive	Cases in Midwifery, vol. ii. p. 288.
4 to 5 hours	Head	do.	Dead	Communicated by Dr. Skae, Leven.
4 hours	Head & arm	do.	..	Annals of Medicine, vol. iv. p. 308.
4 hours	Head	do.	Dead	Communicated by Dr. Radford.
4 hours	Head	do.	do.	Communicated by Dr. Radford.
3 or 4 hours	Shoulder	do.	do.	Seen with Dr. Graham Weir.
3 hours	Head	do.	do.	Communicated by Dr. Radford.
About 3 hours	Head	do.	do.	Communicated by Dr. Ingleby.
Above 2 hours	..	do.	do.	Prov. Trans., vol. vii. p. 338.
Above 2 hours	Arm	do.	do.	Seen with Dr. Lewins of Leith.
Nearly 2 hours	Head	do.	do.	Seen with Mr. Hill, Portobello.
Less than 2 hours	..	do.	do.	Communicated by Dr. Todd.
1½ hour	Arm	do.	do.	Communicated by Dr. Fraser.
1½ hour	Head	do.	do.	Communicated by Dr. Radford.
About 1½ hour	Head	do.	do.	Communicated by Dr. Smith, Glasgow.
An hour or more	Shoulder	do.	Putrid	Communicated by Dr. Ramsbotham.
1 hour	..	do.	do.	Médecine Pratique, tom. ii. p. 224.
1 hour	Head	do.	Dead	Communicated by Dr. Radford.
....	Breech	do.	do.	System of Midwifery, p. 360.
About 1 hour	Breech	do.	do.	Communicated by Dr. Gardiner.
About 1 hour	Head	Died	do.	Communicated by Dr. Smith, Glasgow.
About 1 hour	Head	Recovered	do.	Communicated by Dr. Ingleby.
About 1 hour	Feet	do.	Putrid	Communicated by Dr. Irvine.
Above ½ hour	Head	do.	Dead	Communicated by Dr. Smith, Glasgow.
Above ½ hour at least	..	do.	..	Pract. Obs., Case 154, vol. ii. p. 229.
At least ½ hour	..	do.	Dead	Communicated by Dr. Todd.
½ hour	Head	do.	do.	Communicated by Dr. Radford.
½ hour	Head	do.	do.	Communicated by Dr. Thompson, Hamilton.
½ hour	Head	do.	do.	Communicated by Dr. Radford.
Within ½ hour	Head	do.	do.	Communicated by Dr. Skae, Leven.
About ½ hour	Shoulder	do.	do.	Communicated by Dr. Paxton.

REMARKS.

20. "I found the vagina completely filled with the placenta, and the os uteri firmly contracting upon the funis."
25. "The hemorrhage was very excessive, so long as the placenta was only partially separated, but was immediately suppressed by completely detaching it."
27. Dr. R. saw her "two hours after the first attack of flooding. The placenta was then wholly in the vagina, but there was not the least hemorrhage; the membranes were ruptured; the cervix unexpanded."
29. "Flooding 9 hours before placenta was expelled, but was immediately suppressed on its expulsion."
30. Dr. C. kindly informs me that the woman recovered perfectly.
31. Note by Dr. G.—"There was no flooding previous to the commencement of labour pains, and it was moderate throughout."
32. See case given in full, in Section VI.
34. "Absolutely no more hemorrhage than in a common natural labour."
37. Dr. T. found the placenta lying in the vagina; the pains were strong and effective; and the infant was expelled in half-an-hour.
39. Dr. Wharrie found the placenta partly in the vagina, and partly in the os uteri. He extracted it by a kind of twisting motion, and the hemorrhage immediately ceased.
42. "In this case, the pains entirely left her after the expulsion of the placenta; a full dose of ergot was given, the os uteri being fully dilated, and was followed by one or two smart pains, by which the child was expelled."

(FIRST DIVISION

	By whom observed or reported.	No. of the pregnancy.	Period of delivery.	Degree of hemorrhage *before* the entire separation of the placenta.	Degree of hemorrhage *after* the entire separation of the placenta.	Mode of delivery of the child.
43	Dr. Millar, Kilmarnock	10th	9th mon.	Great, 8 lbs. in 3 dy.	About a pound	Gentle traction
44	Mr. Malcolm, Dundee	Lge. fam.	..	Very little	..	Turning
45	Lamotte	..	..	Great	..	Turning
46	Dr. F. Ramsbotham	9th	9th mon.	Very great	None	By natural pains
47	Mr. Johnstone, Brompton	5th	9th ,,	Very great	None	By natural pains

SECOND

CASES IN WHICH A SHORTER INTERVAL (LESS THAN 10 MINUTES) ELAPSED

48	Dr. Dewar, Dunfermline	..	9th mon.	Profuse	None	By natural pains
49	Dr. Fraser, Aberdeen	6th	8th ,,	Very moderate	Great	Turning
50	Mr. Nimmo, Dundee	Lge. fam.	..	Considerable	..	By natural pains
51	Dr. John Ramsbotham	..	..	Severe	Stopped	By natural pains
52	Dr. John Ramsbotham	3d	9th mon.	..	None	By natural pains
53	Dr. F. Ramsbotham	12th	9th ,,	Exhausting	None	Turning
54	Dr. Smith, Lasswade	3d	9th ,,	Excessive	..	By natural pains
55	Dr. Maxwell Adams	..	7th ,,	Very profuse	..	..
56	Dr. Barlow	2d	9th ,,	Profuse	Profuse	Turning
57	Mr. Crawford, Glasgow	5th	9th ,,	Not great	None	Turning
58	Mr. Crawford, ,,	4th	9th ,,	Exhausting	None	Turning
59	Dr. M'Donald, ,,	7th	9th ,,	Excessive	"A good deal"	Turning
60	Dr. F. Ramsbotham	2d	6½ mons.	Exhausting	None	Evisceration
61	Dr. F. Ramsbotham	3d	8th ,,	Most violent	None	By natural pains
62	Mr. Tindal, Glasgow	10th	9th ,,	Fearful	None	Turning
63	Mr. Denny	..	..	..	..	By natural pains
64	Dr. Conquest, London	Lge. fam.	6½ mons.	Active	..	..
65	Mr. Elkington, Birmingham	..	7th, 8th ,,	A good deal	..	By natural pains
66	Mr. Rose, Swaffham	7th	9th mon.	Not alarming	None	By natural pains
67	Reviewer	..	..	..	..	By natural pains
68	Dr. Menzies, Glasgow	3d	8th, 9th ,,	Considerable	None	By natural pains
69	Mr. James	5th	8th mon.	Very great	Slight	By natural pains
70	Dr. Francis	..	..	..	..	By natural pains
71	Dr. Wilson, Whitburn	4th	..	Slight	..	By natural pains

THIRD

CASES IN WHICH THE PLACENTA WAS EXPELLED IMMEDIATELY

72	Mr. Greenhow, Newcastle	6th	7th mon.	Considerable	..	Extracted
73	Mr. Campbell, Glasgow	1st	7th, 8th ,,	Excessive	..	Turning
74	Mr. Fleming, ,,	5th	..	Considerable	..	Turning
75	Mr. Hardcastle, Newcastle	Several	7th, 8th ,,	Very great	..	By natural pains
76	Mr. Lowe, Manchester	3d	8th ,,	Very profuse	..	By natural pains
77	Mr. Sidebottom, ,,	3d	9th ,,	Very copious	..	By natural pains
78	Dr. Smellie	Several	9th ,,	Slight	..	By natural pains
79	Dr. Stewart, Kelso	6th	8th ,,	Severe	..	By natural pains
80	Mr. Tulloch, Newcastle	Several	7th ,,	..	..	..
81	Mr. Wood, Manchester	6th	8th ,,	Very profuse	..	By turning
82	Mr. Wood, ,,	5th	9th ,,	Very considerable	..	By natural pains
83	Dr. Young, Edinburgh	..	9th ,,	Very great	..	By turning
84	Dr. Currie, Lanark	4th	..	Violent	..	By natural pains
85	Dr. Carruthers, Dundee	3d or 4th	9th mon.	Considerable	..	By natural pains
86	Dr. F. Ramsbotham	4th	8th ,,	Violent	..	By natural pains

REMARKS.

43. "The placenta was lying partly in the vagina, and partly in the uterus. After its extraction, the feet presented, which were laid hold of, and, at each pain, firm but gentle traction employed, till the child was delivered."
45. "I found the placenta occupying wholly the vagina, and pushing almost out of it. I immediately pulled it away, whereupon, the membranes being torn, the waters came in great plenty, and I brought away a dead child by the feet." The flooding had been excessive.
46. Dr. R. found the membranes pressing on the perineum, and the whole of the placenta almost in the vagina. It passed outside immediately on rupturing the membranes.
48. See Case under Section II.
49. See Case under Section VI.
52. Violent hemorrhage came on two days before delivery. It ceased entirely, however, and did not return.
53. Copious hemorrhage came on 3½ hours before delivery, on the membranes spontaneously rupturing. Dr. R. found great part of the placenta in the vagina; there was no pain nor hemorrhage; and he would not have turned, had the shoulder not been the presenting part. The placenta came away, as the shoulders were passing the brim, before the head was extracted.
56. The placenta was expelled while she was on her feet. "She attempted to walk up stairs, and before she could reach the bed, a violent pain seized her, which instantly expelled the placenta, and disparted

—*continued.*)

Time between the birth of placenta and birth of the child.	Presentation of the child.	Results.		Where reported, or by whom communicated.
		To mother.	To child.	
20 minutes	Feet	Recovered	Dead	Communicated by Dr. Paxton.
Upwards of 20 min.	Arm	do.	do.	Communicated by Dr. Keiller.
Not ½ of an hour	..	do.	do.	Traité des Accouchemens, p. 407.
10 minutes	Head	do.	do.	Communicated by Dr. Ramsbotham.
About 10 minutes	Head	do.	do.	Communicated by Dr. Elliot, Carlisle.

DIVISION.

BETWEEN THE SEPARATION OF THE PLACENTA AND THE BIRTH OF THE CHILD.

Less than 10 minutes	..	Recovered	Alive	Communicated by Dr. Dewar.
5 or 10 minutes	..	Died	do.	Communicated by Dr. Fraser.
A short time	Breech	Recovered	Dead	Communicated by Dr. Keiller.
A short time	..	do.	..	Pract. Obs., Case 155, vol. ii. p. 231.
A short time	Breech	do.	Putrid	Pract. Obs., Case 156, vol. ii. p. 233.
A short time	Shoulder	do.	Dead	Communicated by Dr. F. Ramsbotham.
A few pains	Head	do.	Alive	Communicated by Dr. Smith.
A few minutes	Foot	do.	Putrid	Monthly Journal, vol. iv. p. 936.
A few minutes	Shoulder	do.	Alive	Essays on Midwifery, etc., p. 273.
A few minutes	Head	do.	do.	Communicated by Dr. Smith, Glasgow.
A few minutes	Head	do.	do.	Communicated by Dr. Smith, Glasgow.
A few minutes	Head	do.	Dead	Communicated by Dr. Smith, Glasgow.
A few minutes	Shoulder	Died	do.	Communicated by Dr. F. Ramsbotham.
A few minutes	Head	Recovered	do.	Communicated by Dr. F. Ramsbotham.
A few minutes	Head	Died	do.	Communicated by Dr. Smith, Glasgow.
Next pain	..	Recovered	Alive	Lancet, 1831-32, vol. i. p. 110.
Next pain	..	do.	Dead	Communicated by Dr. Conquest.
Soon	..	do.	do.	Communicated by Dr. Ingleby.
Quickly	Head	do.	Alive	Communicated by Mr. Rose.
....	..	do.	..	Med.-Chir. Review, vol. iii. p. 317.
5 minutes	Head	do.	Alive	Communicated by Dr. Smith, Glasgow.
4 minutes	Head	do.	Dead	Lond. Med. Repository, vol. vi. p. 412.
3 minutes	..	do.	Alive	Francis's Edition of Denman, p. 485.
Less than 2 minutes	Head	do.	do.	Communicated by Dr. Wilson.

DIVISION.

BEFORE THE CHILD, OR BOTH WERE EXPELLED TOGETHER.

Almost immediately	Breech	Recovered	Dead	Communicated by Dr. Dawson, Newcastle.
Together	Head	do.	Alive	Communicated by Mr. Campbell.
Turned immediately	Head	do.	do.	Communicated by Dr. Currie, Lanark.
Immediately	Head	do.	Dead	Communicated by Dr. Dawson, Newcastle.
Immediately	Head	do.	do.	Communicated by Dr. Radford.
Immediately	Head	do.	do.	Communicated by Dr. Radford.
Immediately	..	do.	Alive	Midwifery, vol. ii. p. 310.
Immediately	Head	do.	Dead	Communicated by Dr. Stewart.
Immediately	..	do.	do.	Communicated by Dr. Dawson, Newcastle.
Immediately	Head	Died	do.	Communicated by Dr. Radford.
Immediately	Head	Recovered	do.	Communicated by Dr. Radford.
Immediately	..	do.	..	Communicated by Dr. Young.
Almost at same time	Head	do.	Alive	Communicated by Dr. Currie.
Almost at same time	Head	do.	do.	Communicated by Dr. Carruthers.
Not many moments	Head	do.	Dead	Communicated by Dr. Ramsbotham.

REMARKS.

the funis about six inches from the child's navel. A great effusion of blood followed, and the woman fainted ere she could be laid down on the bed."

58, 59, 73. "In these three cases the placenta was detached in introducing the hand to turn, and lay in the vagina till the feet were brought down." Dr. Smith's note.

60. See case at length in Section VI.

62. See case at length in Section VI.

64. Active hemorrhage had taken place before Dr. C.'s arrival. "On examination, the pelvis was filled with coagula, and something like placenta. Another pain expelled an unruptured ovum, which was instantly ruptured, but the child was dead."

68. The placenta was born along with the head; but Dr. M. was sensible of its being wholly detached, and lying in the vagina for fully five minutes.

70. Though not actually stated, it is clear from the context that the woman here, and in Case 143, recovered.

71. When Mr. W. saw the woman there was a little hemorrhage, but not so much as to cause any alarm, either for the mother or child. The pains were strong and downbearing, and in about twenty minutes the placenta was expelled. The next pain expelled the child.

72. The placenta was detached to some extent when Mr. G. was called in. He immediately separated the remainder, and removed it.

78, 91, 92. The fact is not stated, but it is manifest from the context that the mothers recovered.

(THIRD DIVISION

	By whom observed or reported.	No. of the pregnancy.	Period of delivery.	Degree of hemorrhage *before* the entire separation of the placenta.	Degree of hemorrhage *after* the entire separation of the placenta.	Mode of delivery of the child.
87	Dr. Brownlee, Shotts .	6th or 7th	..	..	..	By natural pains
88	Dr. Conquest, London .	..	9th mon.	Violent	..	By natural pains
89	Dr. Dawson, Bathgate .	7th	8th ,,	Profuse	..	By natural pains
90	Professor Murphy, London	Not 1st	9th ,,	Moderate	..	By natural pains
91	Dr. Smellie . . .	2d	8th ,,	..	..	By natural pains
92	Dr. Smellie . . .	..	8th ,,	Profuse	..	By natural pains
93	Anonymous . . .	..	..	..	..	By natural pains
94	Gendrin	..	..	Very great	..	By natural pains
95	Mr. Easton, Glasgow .	..	9th mon.	Considerable	..	By natural pains
96	Mr. Easton, ,, .	..	9th ,,	Considerable	..	By natural pains
97	Dr. F. Ramsbotham	Several	8th & 9th	Exhausting	..	Turning
98	Mr. Rose, Swaffham	4th	9th ,,	Considerable	..	By natural pains
99	Mr. Rae, Edinburgh .	4th	9th ,,	Considerable	..	By natural pains
100	Schweighauser, Strasburg	..	..	..	..	..
101	Dr. Robert Lee, London .	..	7th mon.	Considerable	..	..

FOURTH

CASES IN WHICH THE EXACT PERIOD BETWEEN THE SEPARATION

102	Mr. Bailey, Thetford .	4th	9th mon.	Profuse	Profuse	Turning
103	Mr. Bull	6th	..	Most alarming	..	Turning
104	Cauviere	..	..	..	None	Forceps
105	Dr. Clarke . . .	..	..	..	..	..
106	Dr. Hamilton, Edinburgh	..	..	..	None	..
107	Dr. Hamilton, ,, .	..	..	..	None	..
108	Labayle, Montpellier .	..	..	..	..	..
109	Romaine, Bagneres .	..	..	..	..	..
110	Lamotte	..	..	Severe	Considerable	Turning
111	Dr. Robert Lee, London .	..	7th mon.	Profuse	..	..
112	Leroux	..	7th ,,	Great	Much diminished	Decapitation
113	Dr. Löwenhart . .	..	..	..	..	Turning
114	Dr. Maunsell, Dublin .	..	..	Profuse	..	By natural pains
115	Mr. Milligen . . .	..	..	..	..	By natural pains
116	Sir F. Ould . . .	..	..	Profuse	..	Turning
117	Pardigon	..	7th mon.	Almost none	None	Turning
118	Dr. F. Ramsbotham .	..	..	Copious	Little	Turning
119	Dr. J. Ramsbotham .	..	..	..	Little or none	..
120	Dr. J. Ramsbotham .	..	..	..	Entirely ceased	..
121	Mr. Elkington, Birmingh.	8th	..	..	..	..
122	Dr. Cahill, Berwick. .	..	6th & 7th	..	..	..
123	Mr. Hardcastle, Newcastle	..	..	Very great	Not much	By natural pains
124	Dr. Moody, St. Andrews .	..	..	..	..	Turning
125	Dr. Mather, Brechin .	..	..	Not great	..	By natural pains
126	Dr. Nimmo senior . .	..	..	Severe	..	..
127	Mr. Rose, Swaffham .	7th	9th mon.	Moderate	None	Naturally
128	Dr. Wilson, Glasgow .	Lge. fam.	..	Profuse	Profuse	Turning
129	Dr. Wilson, ,, .	..	..	Profuse	Profuse	Turning
130	F. Osiander, Gottingen .	..	7th mon.	..	..	Naturally
131	F. Osiander, ,, .	..	4th ,,	..	..	Naturally
132	F. Osiander, ,, .	..	7th ,,	..	..	Turning
133	F. Osiander, ,, .	9th	9th ,,	Violent	None	Naturally
134	Dr. Trefurt, ,, .	..	3d ,,	Very great	..	Turning
135	Kory.	..	..	..	..	..
136	Loss, Dorchester .	..	Lge. fam.	..	..	..
137	Giffard	7th	..	Violent	..	Turning
138	Mercier	..	..	None	Almost none	Turning
139	Amand	..	..	Profuse	..	Turning
140	Dr. Tennant, Falkirk .	2d	9th mon.	Severe	..	Forceps
141	Dr. Morrison, Dalkeith .	Several	..	Severe	None	By natural pains

REMARKS.

88. On endeavouring to turn, "the os became so much irritated by the attempt to introduce the hand, that the organ forcibly contracted, expelling the hand, placenta, and child, and an almost incredible quantity of blood."

94. The hemorrhage ceased on the waters being allowed to escape by a female catheter, passed through the placenta four hours before the birth of the infant, which was expelled with the placenta before it, covering the head. Slight hemorrhage followed the delivery.

95. In this case the placenta, though born along with the head of the child, was detached from the uterus about an hour. There was no hemorrhage from the time it was separated.

96. The placenta was born with the body of the child, but it had been detached for some hours.

97. The placenta passed, during the extraction of the child, before the breech.

99. I saw the woman a fortnight after delivery carrying her child, and well. 101. See Sect. V.

103. The arm was found to present after the expulsion of the placenta, and turning was then had recourse to. There is no word of hemorrhage after the placenta was expelled.

104. "Professor Cauviere has told me, that in one case where he introduced the forceps, for inertia of the

—*continued.*)

Time between the birth of placenta and birth of the child.	Presentation of the child.	Results.		Where reported, or by whom communicated.
		To mother.	To child.	
One pain	Head	Recovered	Alive	Communicated by Dr. Wilson, Whitburn.
One pain	..	do.	do.	Communicated by Dr. Conquest.
One pain	Arm	do.	Dead	Communicated by Dr. Dawson.
One pain	..	do.	do.	Communicated by Dr. Murphy.
One pain	..	do.	do.	Cases in Midwifery, vol. ii. p. 311.
One pain	..	do.	..	Cases in Midwifery, vol. ii. p. 313.
Same pain	..	do.	..	Medico-Chirurg. Review, vol. iii.
Together	..	do.	Alive	Médecine Pratique, tom. ii. p. 349.
Together	Head	do.	Dead	Communicated by Dr. Smith, Glasgow.
Together	Head	do.	do.	Communicated by Dr. Smith, Glasgow.
Together	Head	do.	Alive	Communicated by Dr. Ramsbotham.
Together	Head	do.	do.	Communicated by Mr. Rose.
Together	Head	do.	do.	Communicated by Dr. Campbell, Edinburgh.
Together	..	..	..	Pratique des Accouchemens, p. 224.
....	..	Recovered	..	Clinical Midwifery, p. 148, case 269.

DIVISION.

OF PLACENTA AND THE BIRTH OF CHILD NOT KNOWN.

....	Head	Recovered	Alive	London Med. Repos., vol. xvi. p. 451.
....	Arm	do.	Dead	Medical Gazette, vol. xix. p. 622.
....	..	..	..	Pardigon de l'Insertion du Placenta.
....	..	Died	..	Collins' Midwifery, p. 91.
....	..	Recovered	..	Notes of Lectures and Obs., p. 313.
....	..	do.	..	Notes of Lectures and Pract. Obs., p. 313.
....	..	do.	..	Essai sur l'Hém. Uter., Montpellier, 1827.
....	..	do.	..	
....	..	do.	Alive	Traité des Accouchemens, p. 405.
....	..	do.	Dead	Clinical Midwifery, p. 144, case 263.
....	Arm	do.	do.	Leroux sur les Pertes du Sang, p. 262.
....	Arm	do.	do.	Neue Zeitschrift für Geburtsk., bd. vii. h. 3. See Kleinert's Rep., 1842, vi. p. 58.
....	Head	do.	..	Dublin Journal, vol. v. p. 373.
....	..	do.	Alive	Lancet, 1831-32, vol. i. p. 232.
....	Head	do.	do.	Ould's Midwifery, p. 77.
....	Shoulder	do.	..	De l'Insertion du Placente à l'Orifice Uter.
....	Head	do.	..	Pract. Obs., vol. ii. p. 232.
....	..	do.	..	Pract. Obs., vol. ii. p. 235.
....	..	do.	..	Pract. Obs., vol. ii. p. 235.
....	..	do.	Dead	Communicated by Dr. Ingleby.
....	..	do.	do.	Communicated by Dr. Cahill.
....	Head	do.	do.	Communicated by Dr. Dawson.
....	..	do.	Breathed	Communicated by Dr. Smith, St. Andrews.
....	..	do.	Alive	Communicated by Dr. Binning, Arbroath.
....	..	do.	do.	Communicated by Dr. Keiller, Dundee.
....	Head	do.	do.	Communicated by Mr. Rose.
....	..	do.	Dead	Communicated by Dr. Wilson.
....	..	do.	do.	Communicated by Dr. Wilson.
....	Head	do.	do.	
....	Shoulder	do.	do.	Kleinert's Repertorium, 1832. April Number, t. 24.
....	Head	do.	do.	
....	Head	do.	Putrid	
....	Shoulder	do.	..	Hannoversche Annalen, Sep. 1841, Vid. Neue. Zeitschrift für Geburtskunde, 1843, p. 121.
....	..	do.	..	
....	..	do.	Alive	Observationes Medicinales, Lond. 1672, p. 380.
....	Arm	Died	..	Cases in Midwifery, p. 516.
....	..	do.	Dead	Journal Gén. de Médecine, tom. 45, p. 305.
....	Head & arm	Recovered	do.	Observations sur la Pratique, etc., p. 336.
....	Head	do.	do.	Communicated by Dr. Tennant.
....	Head	do.	do.	Communicated by Dr. Morrison.

REMARKS.

uterus, when the head was in the pelvis, he was quite astonished to see the placenta pass out of the vagina, before the child, without the slightest hemorrhage."—*Pardigon's Essay.*

108, 109. "It may happen," says Labayle, "that the placenta, though attached by its centre to the os, is pushed out before the head of the child, and the labour terminates in the most happy manner. I have myself witnessed such a fact; and M. Romaine, Professor of Midwifery at Bagnares, has communicated to me also an observation of this kind."

111. Dr. Lee found the placenta protruding through the orifice of the vagina. He immediately extracted it, and a dead child followed.

101. In this case the placenta was protruding at the os uteri; on drawing it forward gently, the whole ovum escaped without rupture of the membranes.

113. A midwife had separated the placenta, which presented, and had drawn it out of the external parts.

119, 120. I am kindly informed by Dr. Ramsbotham that he knows "one of the mothers recovered, and he believes the other also." 128, 129. See Section V. 137. See case in Section VI.

138. See case in Section VI. For details of other cases see future Sections.

1*st Division.*—Cases in which a considerable interval—varying from ten minutes to ten hours or upwards—elapsed between the expulsion of the placenta and the birth of the child, including the forty-seven instances standing at the head of the table.

2*d Division.*—Cases, comprehending those from No. 48 to No. 71, in which the interval was shorter.

3*d Division.*—Cases, running from No. 72 to No. 101, in which the child was born immediately after the extrusion of the placenta, or expelled with it.

4*th Division.*—Cases, from No. 102 onwards, in which the period intervening between the expulsion of the placenta and child is not specified by the reporters, though the context shows that in many of this class the interval was evidently considerable.

Section IV.—General Deductions regarding the preceding 141 Cases.—1. Number of the Pregnancy. 2. Period of Delivery. 3. Modes of Presentation of the Child. 4. Modes of Delivery. 5. Number of Children lost and saved.

We shall now attempt to state in a generalised form some of the more important points deducible from the consideration and examination of the preceding table. Before doing so, however, I would take this opportunity of remarking, that the total separation and expulsion of the placenta before the infant does not seem to be so very rare and uncommon a circumstance as medical men generally believe, and as authors allege it to be. Dr. Collins states[1] that it is "extremely rare to meet with a total separation of the placenta in unavoidable hemorrhage." In reporting Mr. Denny's case,[2] Mr. Gower observes, "It is perhaps a solitary instance in the annals of obstetric practice. The placenta was brought into the world before the child. The uterus closed upon the body of the fœtus, so as to prevent hemorrhage, and after another pain the child was born alive. It was a quick labour, and no ill effects followed from an accident, from which disastrous consequences might have been reasonably apprehended to both mother and child. Perhaps," adds Mr. Gower, "there is no other such case on record, and it

[1] *Treatise on Midwifery*, p. 90. [2] Table, No. 63.

merits notice, as an example of the competency of nature to provide for extraordinary emergencies."[1]

The number of cases included within the preceding table shows the entire separation of the placenta in placental presentations to be by no means so rare as these and other authors seem to suppose. I have no doubt that the records of medicine contain more cases than I have had leisure or opportunity of searching out, and I feel assured that a more extensive and industrious inquiry of private practitioners than I have been able to institute, might have brought to light a considerable number of additional instances.

1. *Number of the Pregnancy in the cases included in the Table.*—In 81 cases the number of the pregnancy is stated, or facts mentioned, so as to enable us to infer whether the patient had previously borne a family or not.

In 12	cases the mother had	"several" children previously.
4	„	"a large family."
1	case it was the	15th pregnancy.
1	„	12th „
3	„	10th „
5	„	9th „
2	„	8th „
8	„	7th „
6	„	6th „
6	„	5th „
9	„	4th „
10	„	3d „
5	„	2d „
8	„	1st „
Total 81		

2. *Periods of utero-gestation at which the Patients were delivered.*—In 89 cases out of the 141, the requisite information is supplied on this point. The result is as follows:—

Before the 6th month	3	were delivered.
From the 6th to the 7th month	5	„
From the 7th to the 8th month	19	„
From the 8th to the 9th month	19	„
From the 9th to full time	43	„
Total	89	cases.

[1] *Lancet* for 1831-32, vol. i. p. 119.

The preceding data are so far corroborative of the well-known fact, that in placental presentations the labour is very frequently premature. In 28 of his 42 cases of placenta prævia, Dr. Rigby mentions the date at which labour came on. In 13 of the 28 the labour was more or less premature; in 15 the women are said to have reached the full term of pregnancy. Dr. Lee has reported 36 cases of unavoidable hemorrhage;[1] in 3 instances he does not state the date of the labour; in 2 only had the women reached their full time; and in the remaining 31 patients, the labour was premature. Out of 16 cases of the same complication reported by Madame Lachapelle,[2] 1 patient was near the seventh month of pregnancy; 6 were delivered during the seventh month; 5 during the eighth month; 1 at the beginning of the ninth month; 1 towards the middle of it, and 2 during the course of it. Levret discusses at some length the question, "why some of the women who have the placenta implanted upon the cervix uteri arrive at the full time, and why the greater part (*la plupart*) of those who are in the same condition do not reach that period."[3]

3. *Modes of Presentation of the Child.*—This is specified in 90 cases.

In	4	cases	the feet presented.
In	6	„	breech presented.
In	21	„	trunk or upper extremity presented.
In	59	„	head presented.

In 4 of the head cases (Table, Nos. 8, 14, 10, and 139), an arm presented along with the head.

In the above, as in all other statistical returns, referring to the presentation of the child in cases of placenta prævia, the number of preternatural presentations, and particularly of cross-births, is remarkable.

4. *Modes of Delivery of the Child.*—The means by which the children were ultimately delivered have varied greatly, according to the peculiarities arising from the presentation, and the supposed necessity or non-necessity of direct instrumental or other interference.

[1] *Clinical Midwifery*, p. 142, etc.
[2] *Pratique des Accouchemens*, tom. ii. p. 415.
[3] *L'Art des Accouchemens*, Paris, 1771, p. 367.

In	1	case the child was delivered by the	Long forceps.
In	3	„ „	Short forceps.
In	1	„ „	Evisceration.
In	2	„ „	Decapitation.
In	3	„ „	Simple traction.
In	40	„ „	Turning.
In	66	„ „	Natural pains.
Total	116		

In the remaining 25 cases, the manner of delivery is not specified.

5. *Number of Children lost and saved.*—In 113 instances in the Table, the result as regards the life or death of the child is stated. In 1 (No. 10) of the 113 cases, it was malformed (anencephalous) and incapable of sustaining extra-uterine life, and in 6 others it was putrid, or had died before labour commenced. The following statement shows the result as respects the remaining 106 cases:—

In 73 cases the infant was born *dead.*
In 33 „ the infant was born *alive.*

According to these data, nearly 1 out of every 3 children survived;—or 31 per cent of the children were saved, and 69 per cent of them were lost. I shall again have occasion to recur to this topic in the sequel of the memoir.

Section V.—Degree of Hemorrhage before the Separation of the Placenta, its Absence the Exception to the Rule; Degree of Hemorrhage after the Complete Separation of the Placenta, its Presence the Exception to the Rule; Proportion of Cases; no Relation between the Extent of the Hemorrhage and the Duration of Interval between the Detachment of the Placenta and the Birth of the Child.

Out of the 141 cases included in the preceding Table (Sect. III.), we have returns in 111 instances regarding the extent of the hemorrhage that was present, previously to the perfect detachment and expulsion of the placenta. The preceding flooding is reported as

Great	in 72	cases.
Considerable	in 24	„
Slight	in 8	„
Little or none	in 7	„
Total	111	

The seven cases in which there occurred little or no hemorrhage during and anterior to the disjunction of the placenta, are those entered in the Table as Nos. 5, 11, 14, 28, 34, 117, and 138. Mercier has devoted a special essay[1] to the consideration of such exceptional instances to the general rule of flooding occurring as an "unavoidable" symptom in placental presentations. "The hemorrhage," observes Caseaux,[2] "which they have generally considered as *inevitable* in these cases (placental presentations) may, however, not show itself even during the progress of labour, and the dilatation of the cervix uteri may be effected without there escaping one drop of blood." Caseaux afterwards adverts to the opinions which Walter, Moreau, and others have offered in explanation of this exception.[3] The most rational idea seems to be, that in such cases the child has been dead for some time, and the utero-placental circulation in consequence arrested previously to the supervention of parturition.

But in relation to the objects of our essay, it is a much more interesting and important subject for us to inquire into the degree of hemorrhage *after*—than the degree of hemorrhage *before*, the complete separation of the placenta.

"The great and excessive losses of blood," states Mauriceau, in one of his aphorisms,[4] "which happen sometimes to the pregnant woman, proceed almost always from the detachment, in *whole* or in part, of the after-birth from the uterus; and these kinds of losses of blood never cease entirely till the female is delivered."

In criticising this aphorism, Levret observes—"The first part of this statement is, in general, but too true, but the second part is not so constant as Mauriceau gives it. For the daily practice of

[1] "Les Accouchemens ou le Placenta se trouve opposé sur le col de la matrice, sont-ils constamment accompagnés de l'hemorrhagie?"—*Journal de Médecine*, vol. xlv. p. 305.

[2] *Traité de l'Art des Accouchemens*, 1841, p. 559.

[3] See also Velpeau's *Traité Complet des Accouchemens*, vol. i. p. 356, and vol. ii. p. 81.

[4] *Traité des Maladies des Femmes Grosses*, etc., tom. i. p. 534, Aphor. 44.

accoucheurs shows, that there are occasionally women attacked with great hemorrhage, in consequence of partial separation of the placenta, who nevertheless arrive at the natural period of delivery; thus the word *never* is too positive, as it does not allow of any exception, and it can only apply to those cases in which the separation of the placenta is *complete*, and not to those where it is only partially detached."[1]

Levret elsewhere[2] remarks, in his essay on placenta prævia—"Daily practice teaches us that the placenta is never detached spontaneously, without the contraction of the part where it was affixed, and without the detachment of this vascular mass, whether *complete* or partial, being followed by discharge of blood."

The allegations made by Mauriceau and Levret, regarding the continuance of hemorrhage after *total* separation of the placenta, and I might quote similar averments, if necessary, from later authors, are perhaps such as the mind might be inclined to draw, from reasoning upon the subject of complete detachment of the mass. But if we turn from theory to fact—and from preconceived opinions to careful observations, we shall find the above statements perfectly and directly contradicted by the results of practical experience. For I believe that the data which I have collected for the present paper are amply sufficient to establish, as a great physiological and practical fact—that when the placenta, in cases of unavoidable hemorrhage, is once *completely* detached from its connections with the interior of the uterus, the accompanying flooding in general entirely ceases, or becomes quite moderate and inconsiderable in quantity. The cases adduced in the Table (Sect. III.), afford the strongest possible evidence in favour of the truth of this important principle. A slight analysis of them, in reference to this point, will sufficiently demonstrate our proposition.

From the nature of the *Third* Division of the Table of cases, including, as it does, those instances in which the expulsion of the placenta was immediately, or almost immediately, followed by the birth of the infant, we can, from this section of our data, expect few or no decided returns in reference to the degree of hemorrhage existing after the total detachment of the placental mass. In the two or three cases, however, of this division, in which the complete detachment of the organ occurred some time before its complete expulsion—the attendant hemorrhage was observed immediately to cease. Thus, in reference to two instances (Nos. 95 and 96), which

[1] *L'Art des Accouchemens*, etc., p. 395. [2] *Ibid.* p. 347.

occurred in the practice of Mr. Easton of Glasgow, it is stated in the notes of them with which I have been favoured, that though in both the placenta was only expelled immediately before the child, yet it had been previously separated—in one above an hour—and in the other for several hours, and in neither of the mothers did any hemorrhage occur after the placenta was wholly detached from the uterine surface. In both instances the placentæ were originally affixed close to the os uteri—but not over it—and were detached early in the labour.

In the 111 remaining instances, the facts in regard to the existence or non-existence of hemorrhage during the interval between the detachment or expulsion of the placenta and the birth of the child stand as follows:—In 39 out of the 111 cases, the absence or presence of hemorrhage after the expulsion of the placenta is not stated or alluded to by the reporters; but it is evident, from the other circumstances which they describe, that in most of these cases there could have been no serious, if, indeed, any extent of flooding, because the woman was allowed to remain undelivered, in many of them, for a considerable time after the placenta was separated—a state of matters which would not have been permitted if there had been any degree of discharge calling for the immediate delivery of the patient. Three out of these 39 mothers died—one from puerperal fever (Table, No. 4); a second (No. 137), apparently from post-partum hemorrhage;—the cause of death in the other case (No. 104) is not stated.

In 70 of the 111 cases, the existence and degree of hemorrhage, after the complete separation of the placenta, is distinctly stated, and may be tabulated as follows:—

In 44	cases	the hemorrhage	was completely arrested.
10	„	„	very slight, or almost none.
7	„	„	inconsiderable.
1	„	„	ceased.
1	„	„	much diminished.
1	„	„	considerable.
1	„	„	"a good deal."
5	„	„	profuse.
Total, 70			

It thus appears, that after the complete detachment of the placenta, the hemorrhage was totally arrested in a large majority of

the cases; that it was not alarming in its extent in a great proportion of the remaining instances; and that in 5 only out of the 70—or rather in 5 only out of the 111 labours—did it continue so profuse under the circumstances, as to be considered alarming by the attendant, or in such excess as to require special notice in their reports.

Hence in 1 only out of every 22 labours does there appear to have been a continuance of hemorrhage to a great or profuse degree after the placenta was detached. One of the five mothers died (see Dr. Fraser's case in Section VI.) The other four all recovered.

But it may be proper to consider more at length the five cases in which the hemorrhage is stated to have gone on to a profuse extent, after the separation of the placenta, in order to judge better of the circumstances which may lead to its continuance in other instances.

First of all, however, it seems necessary to remark, in regard to the alleged continuance of the hemorrhage after the entire separation of the placenta, that the observation itself—simple and easy as it may appear—is one which is most undoubtedly liable to several sources of fallacy. Some of the authors who have described cases of expulsion of the placenta before the child, and not a few of the medical gentlemen who have communicated to me instances of the kind, have expressed the surprise which they felt at the flooding suddenly ceasing, upon the separation of the placental mass, in contradiction to what their preconceived opinions had led them to expect. Any degree of incaution in the observation of the case might thus easily lead the medical attendant to suppose, that the blood effused externally, or lying in the vagina, was the result of the *continuance* of the hemorrhage subsequently to the total disjunction of the placenta; whilst in reality it might have been the result of the degree of flooding existing antecedently to that event, that is, whilst the placenta was still only partially detached. The blood *already* discharged might, in other words, be readily mistaken for bood in the act of *being* discharged. I am the more inclined to insist upon this source of error, in consequence of the strong fact, that out of all the First Division of cases in our Table—forty-seven in number—where there was a *long* interval between the expulsion of the placenta and the birth of the child, and, consequently, ample time allowed to confirm or correct any observation upon the degree of existing hemorrhage, in not one single instance is the flooding after the complete placental detachment alleged to have been

profuse, or even considerable in its extent. Again, if there had been going on any internal accumulation of blood in the uterine cavity, or rather between the membranes and the uterus, during the period of the *partial* separation of the placenta, and before its complete detachment, the escape of this blood after the expulsion of the placenta might lead to the same error. Another occasional source of fallacy may consist in this, that the membranes may become ruptured by the same pain which expels the placenta through the os uteri or vagina, or they may burst during a subsequent uterine contraction, and the sudden gush of escaping liquor amnii, when mixed with the effused blood, might be readily mistaken for a pure hemorrhagic discharge.

Of the five cases in which the hemorrhage is alleged to have continued to a considerable or great degree after the detachment of the placenta, one affords an illustration of this last remark. I quote it from Lamotte.

Case IX.—*Hemorrhage, with the placenta expelled from the vagina; excessive discharge; turning; infant and mother recovered.*—Lamotte was summoned to a woman who had been in labour from the previous day, and who had been losing blood for about two hours. "I went immediately," to adopt his own narrative, "though it was a good league (*grande lieue*) out of town. As I entered the court, several women came out with frightful shrieks, indicating to me, better than they could tell me, the extreme danger of my poor patient. I instantly descended from my horse, and hurried to where she was. I found that the after-birth had just been pushed out of the vagina by the last pain, and the discharge of blood had come in such abundance, as to have imparted that terrible fright to the bystanders, that had made them utter this piercing cry. I hastened to pull away the after-birth, glided my hand into the uterus, seized the feet of the infant, drew them into the passage, and accomplished the delivery in an instant. The infant was sufficiently alive to be baptized, but died soon after. The mother recovered in a sufficiently brief period, notwithstanding the fearful loss of blood." In some remarks which Lamotte offers upon this case, he observes, that he judged the membranes to have been entire from the surprising evacuation that followed the placenta when he drew it out, and which could not have been all blood, as it came away with much greater violence than it did previously, and the woman could not have borne the loss of such a quantity of blood without sinking. "But I am persuaded," he adds, "that the waters escaping from the membranes in which they were contained, became mixed with the blood effused from the vessels, the midwife having informed me, that the waters were ready to burst, when the accident (the expulsion of the placenta) happened, and they flowed out from my tearing the bag, in separating the placenta."[1]

In the above case of Lamotte's, the evidence of a continuance of true hemorrhage after the detachment of the placenta is by no means decisive; but we have placed it in that category in order to avoid

[1] Table, No. 110.

the fear of error. The continuance of hemorrhage under the same circumstances is probably better marked in the four following cases. For the first two I am indebted to Dr. Wilson of Glasgow, in whose practice they occurred. I shall give them in his own words.

Case X.—*Expulsion of placenta; hemorrhage; turning.*—"*May* 7, 1821.—Mrs. G., the mother of a large family, was seized, near the termination of pregnancy, with profuse flooding. Dr. M. was sent for. He found the placenta presenting; it very soon came away, the discharge continuing. I was called in, and such was the profusion of the discharge and state of exhaustion, that turning was instantly resorted to. The child was dead—there was no discharge after delivery. The recovery was tedious, but at length complete." [1]

Case XI.—*Placenta lying with its* fœtal *surface over the os uteri; hemorrhage; turning.*—"*April* 17, 1833. This evening I was sent for by Dr. Cunningham to see Mrs. ——, Portugal Street, who was flooding, and had been for several hours. The placenta was found lying loose over the os uteri, with the *fœtal surface downward;* the finger at once touched the origin of the umbilical cord. The placenta was turned aside, the feet laid hold of, and a dead child extracted. She made a good recovery." [2]

This last case is, so far as I know, unique, in the circumstance of the placenta being found quite inverted over the os uteri, or with its fœtal, instead of its maternal surface, lying in contact with that part. It may probably so far be regarded as a proof that in this instance there was a cause for the hemorrhage continuing, in a most unusual and extreme degree of atony or relaxation of the uterus—a state which would seem necessary in order to admit of the possibility of the inversion of the placental mass. In the two following cases of Mr. Barlow and Mr. Bailey, we have the hemorrhage persisting under different conditions, viz., the patient being in the upright posture at the moment of the separation and expulsion of the placenta; and besides, having in the first of them that disposition of the uterus, whatever its special nature may be, which gives rise to post-partum hemorrhage.

Case XII.—*Expulsion of the placenta preceding the delivery of the child; hemorrhage both after the expulsion and delivery.*—A woman in the last month of her second pregnancy suffered from uterine pains and a slight discharge of blood at intervals. The hemorrhage ceased when the horizontal position, etc., were adopted. Next morning Mr. Barlow was summoned to see her, and found her sitting on a chair in a state of great alarm, a profuse discharge of blood succeeding every pain. "On requesting her," he continues, "to be conveyed to bed, she attempted to walk up stairs, and before she could reach the bed, a violent pain seized her, which instantly expelled the placenta, and disparted the funis about six inches from the child's navel. A great effusion of blood followed, and the woman fainted ere she could be laid down on the bed." Mr. Barlow passed up

[1] Table, No. 128. [2] *Ibid.*, No. 129.

his hand into the uterus, found the os uteri in a lax and dilated state, with the shoulder presenting, laid hold of the feet, and accomplished the delivery of the child, by turning, in a few minutes. "The child appeared feeble, but soon recovered on being placed in a warm bath. A considerable hemorrhage," he adds, "followed the birth; on perceiving which, I returned my hand into the uterus, and by keeping it moving therein for a time, its contractions were renewed, and the hand was then withdrawn, and the flooding abated, and though the woman appeared much reduced through the loss of blood, she soon recovered."[1]

Case XIII.—*Unavoidable hemorrhage supervening during exertion; sudden expulsion of the placenta; turning; mother and child saved.*—The case occurred to Mr. Bailey of Thetford. A woman, aged 32, three weeks before the time of her expected fourth confinement, when exerting herself by washing, etc., was seized with a sudden and violent flooding, accompanied by an extreme degree of bearing down, which, to make use of her own expression, felt "as if the head of the child was in the birth." In the act of stepping upon the bed, she was taken with a pain, during which the placenta was forcibly expelled, and was suspended between the thighs by the funis. At this moment a deluge of blood followed, and she sunk down senseless upon the bed, to all appearance dead, the pulse being imperceptible, and the skin covered with a cold clammy sweat. The os uteri was found to be completely dilated, the passages were well relaxed, and the head presented in the first position. Turning was adopted, and easily accomplished. During the operation, "the hemorrhage was alarming, and large coagula were present in the uterus, which were expelled as soon as the child was born. When the uterus was excited to contraction, the hemorrhage ceased. The child at first appeared to be still-born, but was restored by the proper means. Both the mother and the infan did well."[2]

In relation to the last two cases of alleged hemorrhage after the placenta was totally separated, it deserves to be specially held in view that, as already alluded to, in both cases the patients at the time at which the placenta was detached were in the upright position—a circumstance which is well known to be a very certain cause of post-partum hemorrhage when there is any tendency to that condition;—in both patients the cervix uteri was very relaxed, the introduction of the hand in the operation of turning being performed with great ease;—in both, the *complete* separation of the placenta must have occurred a very short time before delivery, as each of the children was born alive;—and in the last patient (Mr. Bailey's), the discharge of blood which took place after the expulsion of the placenta must have been to some extent the result of a *previous* internal accumulation occurring during the partial separation of the placental mass, as the blood itself had had time to coagulate. This internal hemorrhage and accumulation of blood probably occurred also in the remaining case upon our list of hemorrhage after the complete separation. For the details of it, see Dr. Fraser's case in the next section, and the remarks upon it.

[1] Table, No. 56. [2] *Ibid.*, No. 102.

That the extent of the hemorrhage has no direct relation to the extent of the interval between the expulsion of the placenta and the delivery of the child, is amply attested by the following facts:—All the reputed instances of hemorrhage after the complete detachment of the placenta, have occurred in cases where the interval between the birth of the placenta and that of the child was short and uncertain; or, in other words, among the patients included in the Second and Fourth Divisions of the General Table. Among the cases belonging to the First Division of the Table, in which the interval between the detachment of the placenta and the delivery of the child was longer, and varied from ten minutes to ten hours, and where, consequently, there was more time to observe any degree of flooding that might exist, *in not a single instance was the hemorrhage observed to be great, or even considerable in extent.* On the contrary, in one only of the forty-seven cases belonging to this division was it in any unusual degree;[1] in nine, it is reported as "almost none," "trifling," or "slight," or "very slight;" and in twenty-three cases it was totally and completely arrested. In nine, the degree of it, if any, is not stated.

I shall have occasion to revert to the practical bearing and importance of these facts in a future section of the essay.

Section VI.—Comparative Mortality in Placenta Prævia, from Turning, etc., and from Expulsion or Extraction of the Placenta: Ten Fatal Cases after Spontaneous Expulsion: Details of each Case; Seven of them independent of the Separation of the Placenta: Nature of the Three remaining Cases.

In common cases of placental presentation we have already found, from ample statistical data, that the average mortality to the mother is about 1 in 3 (see Section I.) Among the 141 cases of expulsion and extraction of the placenta, which we have collated into the Table (Sect. III.), 10 mothers died, or the average mortality to the mother was 1 in 14. The difference between the two sets of cases—namely, 1st, Those terminated according to the present recognised rules of midwifery; and, 2d, Those terminated by the spontaneous expulsion or extraction of the placenta—is sufficiently striking when thus simply stated. The contrast may be more easily appreciated if we tabulate the results in the following manner:—

[1] Case 43. The patient lost 8 lbs. of blood in three days, and "about a pound" after the expulsion of the placenta.

Mode of Management.	Number of Cases.	Number of Maternal Deaths.	Proportion of Maternal Deaths.
Cases treated by extracting the child before the placenta, rupture of the membranes, etc.	654	180	1 in $3\frac{6}{10}$
Cases in which the placenta was expelled or removed before the child.	141	10	1 in 14

The evidence in favour of the safety of the termination of such cases by the expulsion or extraction of the placenta before the child, will become still more striking if we turn our attention specially to the ten fatal cases themselves; for we shall find that the fatal result in few, if any, of these cases, can be directly traced and ascribed to the circumstance of the placenta being completely separated, or to any possible consequence arising from that separation. An examination of these ten fatal cases in detail will sufficiently prove this remark.

Four of the ten mothers died several days subsequently to delivery. I shall first describe these four cases, so far as I have notes of them, to show more clearly the immediate cause of death in each.

Case XIV.—*Placenta expelled an hour before the child; patient died on 10th day, after having been up, and exposed to excitement and injury, on the 9th.*—The case occurred in the practice of Mr. Hay of Glasgow. It was a first pregnancy, and the patient had arrived at the full period. Before the separation of the placenta, the hemorrhage was excessive, and she was quite sunk and exhausted. Very little blood was lost after the placenta had come away, though the infant was not born for an hour. It was expelled by the natural pains, and was still-born. The following is Mr. Hay's note on the case :—"This patient seemed to sink from excitement. She and her husband quarrelled on the 9th day after the birth of the child, and on the 10th she died." Dr. Smith of Glasgow,[1] who has reported this, with various other cases, to me, states more explicitly, that "she left her bed and fought with her husband till perfectly exhausted, from which state she never recovered."[2]

The fatal result in this case does not require a word of comment; the fact of the woman being able to leave her bed, and to act in the way described, is sufficient proof that she was in a fair way of recovery, and that she would in all likelihood have done well, had it not been for her own indiscretion. In the instance which I have next to quote, the fatal event is also ascribed by the reporter to

[1] I am happy in having this opportunity of offering my best thanks to Dr. Smith for the very great zeal and kindness with which he has assisted me in Glasgow, in the collection of cases for the present memoir. [2] Table, No. 32

imprudence on the part of the patient, and, at all events, the degree of hemorrhage was such as in no way to endanger her life.

CASE XV. — *Spontaneous expulsion of the placenta; little or no hemorrhage either before or after its separation; death on the 7th day from "purpura alba."*— "About 16 years ago, I was called," says Walter,[1] "to the assistance of the wife of the former Castellano of the Royal Academy of Treptow. On arriving, I found her in bed; labour had commenced at 4 A.M., seven hours before; the placenta was already separated, and had fallen to the ground; it was still attached to the infant by the cord. I was astonished at this very rare phenomenon, which at that time I could not explain, as I did not then understand the structure of the uterus as I now do. As it was a cross presentation, I had recourse to turning, and within a few moments I delivered the woman of a dead child. I can affirm most positively," the author adds, "that before my arrival, and during the labour, the woman did not lose above two ounces of blood. She did well till the third day, but an improper and contentious mode of living (*inordinata atque contentiosa vivendi ratio*) was the cause of her being seized with '*purpura alba*,'[2] of which she died on the 7th day after delivery."[3]

In two of the fatal cases the mothers died from puerperal fever or peritonitis. These two instances have been recorded by Dr. Merriman and M. Mercier, and I shall detail them, as nearly as is consistent with brevity, in the author's own words.

CASE XVI.—*Placenta expelled long before the child*, etc.—"I was once," Dr. Merriman states,[4] "consulted by a very careful and judicious practitioner, respecting a woman, who, when I first saw her, was rapidly sinking under puerperal fever. In this case the placenta was expelled many hours before the child was born, and no extraordinary means were used to expedite the delivery of the child; a physician accoucheur, who was consulted upon the occasion, having deemed it more prudent to leave the case to nature. The fatal event, however," Dr. Merriman unadvisedly adds, "would lead one to doubt whether it was wise, under such circumstances, to decline the interference of art."[5]

CASE XVII.—*No hemorrhage with the first part of the labour; vomiting; fever; placenta spontaneously expelled; child delivered with forceps; mother died of peritonitis nine days after delivery.*—For upwards of two days before Mercier saw the patient, she had been attended by a midwife, and latterly by a medical man, who, being called in during the course of the second day, and finding the woman feverish, had bled her largely. The bleeding had lessened the pains, which did not return till that evening. The patient had not suffered from any discharge of blood from the uterus, but she felt extremely uneasy; was not able

[1] *De Morbis Peritonæi et Apoplexiâ;* Berlin, 1785, p. 33.

[2] Or "miliaria," a disease which, under the old "heating" method of treating puerperal women, was formerly extremely fatal. The Stockholm Academy proposed in 1769 as a prize question, "How the different kinds of miliary fever should be prevented and cured, as well in lying-in women as in others." The successful author, Schultz, showed strongly the necessity of adopting a cooling regimen. Dr. Whyte's excellent Essay on Miliary Fever (*Treatise on Lying-in Women*, pp. 25-55) did much to banish the disease from English practice.

[3] Table, No. 9.

[4] *Synopsis of difficult Parturition*, p. 126.

[5] Table, No. 4.

to rest in bed; and rejected by vomiting everything that was given to her. About two o'clock on the morning of the third day, while she was walking about with a person supporting her, a strong pain expelled the placenta, which fell to the ground, followed immediately by the escape of the waters. The embarrassment of the midwife was extreme. She divided, however, the cord, and waited the arrival of M. Mercier, whom she had immediately summoned. The pains again ceased, and the woman, having been put to bed, got a little sleep. "The placenta," says M. Mercier, "was shown me, of a small size, and covered with dust. The cord was implanted in its middle, and about half-a-yard of it was attached. Only a few spoonfuls of blood had been lost in addition to the small quantity that had escaped from the cord when it was divided." In consequence of it being impossible to excite the uterus to sufficient action, it became necessary to terminate the labour by the forceps. This was accomplished easily. The child did not appear to be at the full time. Its extraction was followed with a very moderate effusion of blood, which scarcely penetrated a cloth folded four times. "This small quantity," observes Mercier, "joined to what had accompanied the falling of the placenta, did not exceed the loss of blood in ordinary labours."[1] An hour after delivery there was sanguinolent oozing, which soon ceased. Subsequently, however, the woman was attacked with peritonitis, and died of this affection nine days after delivery.[2]

Besides the four instances of death which we have just described, at periods more or less distant from delivery, two others of the ten fatal cases occurred within a very short time after the birth of the infant, and a third (Dr. Ramsbotham's) appears also to come under this head. Yet, as will appear from the details which we shall now give, the death in these cases was not apparently in consequence of any hemorrhage or other cause arising from the complete separation of the placenta, the hemorrhage in all of them having ceased when this separation took place. All the three mothers were delivered by operative means.

Case XVIII.—*Severe hemorrhage and presentation of the arm; child eviscerated to permit delivery; placenta detached during the operation; no hemorrhage from its detachment; mother died.*—The case occurred in the practice of Dr. Ramsbotham, to whose kindness I am indebted for the following details. On December 24, 1839, Dr. Ramsbotham was called to see Mrs. E., who was gone 6½ months in her second pregnancy. She was in a state of exhaustion from severe hemorrhage, having lost about two quarts of blood. "The previous attendant," to give Dr. Ramsbotham's own words, "ruptured the membranes at 7 or 8 A.M., after which there was no further hemorrhage. The arm now came down, which he took off. I delivered her with great difficulty, owing to the undeveloped state of the cervix, at 4½ P.M. I could not get the hand into the uterus, but managed to perforate the chest by a blunt hook, and to extract many of the viscera. In trying to perforate the chest, I hooked down the placenta, a part of which was hanging loose in the vagina; *still there was no flooding.*"[3]

Case XIX.—*Profuse and exhausting hemorrhage, terminated by expulsion of*

[1] *Journal Ancien de Médecine*, tom. xlv.
[2] Table, No. 138. [3] *Ibid.*, No. 60.

the placenta; turning; immediate death.—The woman was a patient of Mr. Wood's of Manchester. She had borne five children previously, and had reached the eighth month of her sixth pregnancy. The hemorrhage was very profuse previous to the expulsion of the placenta, and had caused great exhaustion; after this it completely ceased. Turning was immediately had recourse to, and a dead infant was extracted by the feet. She died immediately after her delivery.[1]

Case XX.—*Head presentation and unavoidable hemorrhage; placenta completely detached in the operation of turning; previous exhaustion; death.*—The woman (a patient of Mr. Tindal's of Glasgow) was at the end of her tenth pregnancy. The head of the child presented. There was fearful hemorrhage before the placenta was expelled, but none after. Delivery was effected by turning, a few minutes after the escape of the placenta. The mother died in half-an-hour. "In this case," Dr. Smith observes, in the note which I have received with it, "the patient was exhausted previous to turning, and that operation was adopted to have delivery effected before she died. The placenta was accidentally separated during the course of the operation, and Mr. Tindal was perfectly certain that the hemorrhage ceased from that moment."[2]

In the three remaining cases of maternal deaths, the fatal occurrence took place during labour, or immediately subsequent to delivery. Of two of the three cases I have only very imperfect notes, which I give, such as they are, before offering any comment on them.

Case XXI.—"*Flooding, with one arm and part of the placenta slipped down below the os uteri internum;*" *turning; post-partum hemorrhage; death.*—October the 17th, 1731, about ten o'clock in the morning, Mr. Giffard was sent for to the wife of a printer, near White Fryars; "She had been seized," to use his own words, "about an hour before with a violent flooding, and when I came, I found she had lost a large quantity of blood; and I was told she was in about the seventh month of her reckoning. Upon touching, I found one arm of the child slipped out beyond the os internum, as also a large part of the placenta; wherefore, I gave it as my opinion, that she ought to be immediately delivered—letting her husband and others know the great danger she was in. As it was entirely left to my conduct, I immediately passed up my hand, well greased, into the vagina, and so on by the side of the shoulder into the uterus, where I met with the remaining part of the placenta, wholly separated from the uterus. I now passed my hand between the placenta and the body of the child, and soon met with one foot, which I drew out beyond the labia pudendi, and then taking hold of it with a soft cloth, with a little difficulty, I brought out the hip and the body almost to the shoulders, when, finding it stopped at the head, I passed in my hand, and brought down one arm, the other not being slipped up again from its first falling down. I then endeavoured to draw out the head, but it would not readily follow; whereupon I passed up one finger into the child's mouth, and strove, by pressing upon the lower jaw, to bring the face forwards, whilst at the same time I pulled above at the shoulders; but as it was closely locked between the bones that form the lower part of the pelvis, I had no small trouble in bringing it out; however, at last I finished the delivery by bringing away the placenta, which, being before loosened from every part of the uterus, readily followed. I

[1] Table, No. 81. [2] *Ibid.* No. 62.

was then in hopes we had surmounted our greatest difficulties, and that the flooding would have stopped; but, to my great surprise, she continued still draining. I therefore again gently passed up my hand, believing that either some part of the placenta was torn off and left, or else that some coagulated blood kept the womb distended; but I could not meet with any part of the placenta, or any clots of blood. I then ordered cloths dipped in vinegar to be applied close to the parts, and what else I thought necessary, yet, notwithstanding all my endeavours to save her, *amisit cum sanguine vitam.*" [1]

Case XXII.— *Unavoidable hemorrhage, with apparent hydrothorax and cardiac disease; death speedily after the expulsion of the placenta; living child subsequently extracted.*—The case occurred to Dr. Fraser of Aberdeen. It was the patient's sixth pregnancy. Labour came on at the eighth month. Very moderate hemorrhage had been going on for two hours, when the placenta became very extensively detached by one uterine contraction, and the mass of it was found lying in the vagina. "The accompanying hemorrhage," Dr. Fraser states, "was great, and, without convulsions, she expired in two minutes." A few minutes afterwards, Dr. Fraser passed his hand into the uterus, and extracted the child alive. "A *post-mortem* examination," Dr. Fraser adds, "was not allowed, but from a combination of marked symptoms, I have a strong conviction that she laboured under hydrothorax, depending on a diseased state of the heart." [2]

Case XXIII.—*Fatal detachment of the placenta.*—In speaking of the complete separation of the placenta in unavoidable hemorrhage, Dr. Collins states, "Dr. Clarke informed me, that he had met with one case of total separation; the patient was dying before he reached the house." [3] By a private note from Dr. Collins, I am informed that he knows no more of the case than what is stated in the above sentence, and that in consequence of Dr. Clarke's death, it is now impossible to obtain more details. [4]

GENERAL REMARKS ON THE TEN FATAL CASES.

In all the first seven of the preceding fatal cases, the separation of the placenta, or the degree of hemorrhage after its detachment, had evidently little or no connection with the death of the mothers. In the first case, No. XIV. (Mr. Hay's), the blood lost during the hour that elapsed between the expulsion of the placenta and birth of the child, is averred to have been "very little;" in the second case (Walter's), not more than two ounces of blood escaped in all during the whole labour; in the third case (Dr. Merriman's), the hemorrhage, after the expulsion of the placenta, was, in all probability, inconsiderable, or altogether arrested, as it was not deemed necessary to expedite delivery, though the placenta was thrown off several hours before the infant was born; in the fourth case, the narrator (Mercier) distinctly attests, that the whole loss of blood was not greater than with an ordinary labour; in the fifth case,

[1] Table, No. 137. [2] *Ibid.* No. 49.
[3] *Practical Treatise on Midwifery*, p. 91. [4] Table, No. 105.

there was, to use Dr. Ramsbotham's own expression, "no flooding" after the placenta was detached, and there had been none for some time previously; in the sixth case (Mr. Wood's), the hemorrhage completely ceased after the total separation of the placenta; and in the seventh case (Mr. Tindal's), the same fact was observed. In these two last cases, though both patients sunk principally from the effects of hemorrhage, yet in both of them that hemorrhage had occurred antecedently to the detachment of the placenta; the mischief, in so far as the flooding was concerned, was done before that detachment took place; in neither of them did the peculiarity of the complete separation of the placenta occur until the case was already so far hopeless, from the antecedent discharge, and, indeed, so far from being injurious, the separation of the placental mass would, on the very contrary, by its immediately arresting flooding, seem to have been salutary, though unfortunately in each too late to save.

On the other hand, there occurred, in the course of these seven fatal cases, circumstances and complications amply adequate to account for the deaths of the mothers, quite independently of the separation of the placenta, or of any flooding or other possible accident connected with that separation. In Mr. Hay's case, the patient's death was evidently the result of the strong excitement and injuries to which she was subjected on the ninth day after delivery. Walter, as we have seen, attributes the attack of the disease ("purpura alba," or miliary fever), of which his patient died, to her own indiscretion. In Dr. Merriman's and Mercier's cases, puerperal fever and peritonitis were the causes of the fatal issue—a disease that too often occurs, independently of any morbid complication whatever, during labour. Mercier's patient had, though there was no accompanying flooding, become so exhausted, and the expulsive powers so inefficient, by the time he saw her, that instrumental delivery was deemed necessary. In Dr. Ramsbotham's case (an arm-presentation), the child was delivered by evisceration of the chest and abdomen, an operation in itself sufficiently dangerous, and never employed except when even turning is impossible; and, in the present instance, it had its difficulties much enhanced by the rigid state of the os uteri. Lastly, in Mr. Tindal's and Mr. Wood's cases, extraction of the infants by version was had recourse to, at a time when the mothers were already greatly exhausted, and little able to withstand the additional shock of such an operation. Thus, in two of the fatal cases (Mr. Hay's and Dr. Merriman's), the delivery was effected by the natural pains; and the cause of death in

each was apparently independent of any circumstances connected with the detachment of the placenta. In five of the cases (Walter's, Mercier's, Dr. Ramsbotham's, Mr. Tindal's, and Mr. Wood's), the delivery was accomplished by such operative means as are in themselves always more or less perilous to the life of the mother, particularly when, as in some of them, she had already become prostrated and exhausted by the time they were adopted.

For the above reasons we are, I believe, quite entitled to reject, in regard to the first seven fatal cases, the idea of the death of the mother's being caused by the total separation of the placenta, or by its mediate or immediate consequences.

If this be granted—and we subtract on this ground the first seven fatal cases—we have only, out of 141 deliveries, three maternal deaths left, which can be at all ascribable, directly or indirectly, to the complete detachment of the placenta, and its results. This would give a mortality of only one in about every forty-seven mothers from this complication during labour, in placental presentations ; a proportion which, it must be confessed, is surprisingly small.

But it seems, indeed, even more than doubtful, whether all the three remaining fatal cases (Mr. Giffard's, Dr. Fraser's, and Dr. Clarke's) should be allowed to have been instances in which the death of the mothers was attributable simply to complete separation of the placenta, and its effects.

Mr. Giffard's patient died, if we may judge from his own account, of post-partum hemorrhage—a complication which is known to be a special source of danger to the mother after placental presentations, under all modes of management.[1] The hemorrhage was here probably the result of the injury and laceration of the vascular and imperfectly dilated neck of the uterus, in consequence of the force employed in the operation of the extraction of the shoulders and head of the infant. This view would seem to be so far corroborated by the fact, that the post-partum discharge was not connected with the presence of any clots of blood in the uterus, and hence, was not the effect of atony of the body or fundus of the organ. At all events, the fatal hemorrhage was not, in Mr. Giffard's patient, in any ap-

[1] See on this topic Dr. Hamilton's *Practical Observations*, second edition, p. 329. In speaking of placenta prævia, he states, in reference to flooding from the ruptured vessels of the neck of the uterus (the body and fundus of the organ being contracted), that for many years past he has been led to "dread this danger in every case where he has been obliged to force delivery in consequence of uterine hemorrhage."

parent way, dependent upon the *previous* complete detachment of the placenta during the labour; and hence, we might probably be entitled to remove this case also, like the preceding seven, from the list of those in which the death of the mother could be attributed to the contingent separation and expulsion of the placenta.

In Dr. Fraser's case, the chest-affection may have had a principal share in the sudden demise of the patient—the presence of heart-disease (supposing such existed) predisposing, as is well known, the subjects of it to be greatly, and, in some instances, fatally, affected by any rapid losses of blood, and occasionally leading, as I have known in two instances, to sudden death, from the shock of the delivery, when the labour was in other respects quite natural. I would add, that the details which I have obtained through Dr. Fraser's kindness are not by any means perfectly decisive as to the whole placenta being completely detached in this instance. The same remark may apply to the other remaining case of Dr. Clarke; if we may judge from the little information that we do possess in reference to it, and contrasting it with the results ascertained in other well-observed instances. The account of Dr. Clarke's patient is so brief and defective, as to furnish us with no data whatever as to the extent and nature of the accompanying hemorrhage, the existence or non-existence of any other complication, the delivery or not of the child, or the immediate cause of the fatal event to the mother.

SUMMARY OF RESULTS.

Our inquiry, so far as we have hitherto proceeded, seems legitimately to admit of the following deductions :—

1. The complete separation and expulsion of the placenta before the child, in cases of unavoidable hemorrhage, is not so rare an occurrence as accoucheurs appear generally to believe.

2. It is not by any means so serious and dangerous a complication as might *a priori* be supposed.

3. In nineteen out of twenty cases in which it has happened, the attendant hemorrhage has either been at once altogether arrested, or it has become so much diminished as not to be afterwards alarming.

4. The presence or absence of flooding after the complete separation of the placenta, does not seem in any degree to be regulated by the duration of time intervening between the detachment of the placenta and the birth of the child.

5. In ten out of one hundred and forty-one cases, or in one out of fourteen, the mother died after the complete expulsion or extraction of the placenta before the child.

6. In seven or eight out of these ten casualties, the death of the mother seems to have had no connection with the complete detachment of the placenta, or with results arising directly from it; and if we do admit the three remaining cases, which are doubtful, as leading by this occurrence to a fatal termination, they would still only constitute a mortality from this complication of three in one hundred and forty-one, or of about 1 in 47 cases.

7. On the other hand, under the present established rules of practice, one hundred and eighty mothers died in six hundred and fifty-four placental presentations, or nearly one in three.

II.[1]

Section VII.—Mechanism by which Hemorrhage is prevented after the Complete Detachment of the Placenta; Source of the Discharge in Partial Detachments of the Placenta; Means by which the Hemorrhage is arrested in Placental Presentations when the Detachment is partial: and when it is complete; Analogous Cases in Twin Labours; Analogous Phenomena in the Third Stage of Common Labour; Modes by which Hemorrhage is prevented, from the Vascular Orifices left exposed on the Interior of the Uterus.

In his *Outlines of Midwifery*, Professor A. Hamilton, after laying down the necessity of turning in placental presentations, observes, "In some instances, before the *orificium uteri* can be sufficiently opened to admit the hand of the operator to pass, the whole cake will actually be disengaged and protruded; but," he adds, "the separation and expulsion of the placenta previous to the birth of the child is, for the most part, fatal to the mother."[2]

"If the placenta," says Petit, when speaking of unavoidable hemorrhage, "is entirely separated, the death of both the mother and child is certain."[3]

[1] First published in *Obstetric Memoirs and Contributions*, 1855, vol. i. p. 720, though printed and privately circulated several years previously.

[2] *Outlines of Midwifery*, p. 44.

[3] *Traité des Maladies des Femmes*, etc., tom. ii. p. 22.

"When the placental mass is thus expelled before the child, the hemorrhage," observes Carus, "must necessarily be so considerable, that both child and mother usually become a prey to death (*eine Beute des Todes.*")[1]

These three quotations express what seems to be the general opinion of medical men in regard to the complication which we are considering. I have already, however, taken occasion to show that the very reverse of the above statements is more consonant with fact and experience, and that the complete disjunction and expulsion of the placenta before the child, is an accident neither very fatal to the mother, nor very frequently followed by any great or perilous degree of hemorrhage. Let us now inquire if we can explain the mechanism by which it happens, that generally, after the complete separation of the placenta from the uterus has occurred, not only does no considerable degree of hemorrhage supervene, but the preceding and sometimes violent discharge is at once arrested, and thus the life of the mother preserved against the impending danger of frightful and fatal flooding. The investigation will, I believe, lead us to entertain more decided views with regard to the propriety of the practice to which our present Essay points.

The explanation that would occur to most minds, on first thinking of the probable mode by which nature could arrest and prevent hemorrhage after the total separation of the placenta before the child, is that offered by Drs. Ramsbotham and Campbell. "I think," says Dr. Ramsbotham, "it may be satisfactorily explained how the woman's life is preserved. The head of the child is pushed down upon the os uteri, which suddenly gives way. Under its relaxation, the placenta is loosed from its previous attachment, and falls down before the head, which now comes into immediate contact with the bleeding vessels, and by mechanical compression closes their mouths; from this moment, therefore, the loss of blood is suspended, and the head is afterwards expelled by uterine action."[2] Dr. Ramsbotham here imagines that the head of the infant acts, in such cases, as a compress or plug upon the open uterine orifices left by the separation of the placenta from the interior of the cervix.

"It may," remarks Dr. Campbell, "be presumed, that in these cases the fatal event must have been prevented by the quick

[1] *Lehrbuch der Gynæcologie*, tom. ii. p. 442.
[2] *Observations in Midwifery*, Part ii. pp. 191, 192.

descent, and consequent pressure, of the body of the child, upon the point whence the placenta had been detached."[1]

That the above opinion[2] of Drs. Ramsbotham and Campbell does not afford the correct explanation of the cessation of hemorrhage after the complete detachment of the placenta, appears to me to be evident from the following facts:—1st, That in some of those few instances in which the hemorrhage continued after the total separation of the placenta, the infant's head did present, but did not produce the result here attributed to it (see, for instance, Mr. Bailey's case, Sect. V.); and 2d, On the other hand, in a considerable number of the instances that we have collected, and in which the placenta was entirely detached and expelled before the child, the hemorrhage totally ceased, although the portion of the child that presented against the cervix uteri was not the head, nor indeed any such part as could produce the required degree of pressure upon the open uterine orifices.

In two of the instances which I have myself seen, and already detailed in a previous section (Sect. II.), the shoulder and neck presented in one, and the arm of the child in another—parts which could not be applied as plugs in the way supposed by Dr. Ramsbotham and Dr. Campbell.

In a considerable proportion of cases collated into our General Table, the child presented preternaturally with the foot, feet, arm, or shoulder. These parts are all of such a form and size, that they could not be applied as compresses upon the part of the uterus which was exposed by the previous detachment of the placenta, and yet the hemorrhage appears to have been as *constantly* and as *completely* arrested in those instances, when once the placenta was perfectly separated, as it was in cases in which the head or breech of the child came afterwards to press upon the cervix uteri. The following tabular view will demonstrate this important point, by showing the number of instances in which a lower or upper extremity came down after the expulsion of the placenta, and the degree of the hemorrhage that was observed to follow in these cases.

[1] *System of Midwifery*, p. 369.

[2] Since the above was written, I find that Dr. Radford of Manchester has published the same opinion regarding the suppression of the hemorrhage as Drs. Ramsbotham and Campbell entertain. "On a complete separation of the placenta," he remarks, "the hemorrhage is immediately and completely suppressed, provided the uterus is in a condition to so far contract, as to force down the head, with the placenta, upon the uterine openings."—*Provincial Medical and Surgical Journal* for January 22, 1845.

Degree of Hemorrhage after separation of Placenta in	Footling Presentations.	Arm or Shoulder Presentations.	Total.
Great	...	1[1]	1
Considerable . . .	1[2]	...	1
Slight	...	2	2
Little or none . . .	2	8	10
Not stated	2	7	9
	5	18	23

These data prove, that "great" or "considerable" hemorrhage, after the expulsion or detachment of the placenta, is not more liable to occur when the retained fœtus afterwards presents by an upper or lower extremity, than when it comes down with the head or breech upon the exposed surface of the cervix uteri. The proportion of cases in which the hemorrhage continues is not greater under the one set of presentations than it is under the others, as may be seen by comparing the present table with that previously given at p. 200. And these observations seem to me to afford amply sufficient grounds for rejecting the idea, that the prevention of the hemorrhage after the complete separation of the placenta is to be explained, by the presenting part of the infant coming down, and acting as a compress upon the exposed orifices of the uterine vessels. It may be an auxiliary, but it is not a primary or essential cause of the suppression of the hemorrhage. For the mechanism of the arrestment of the flooding, in cases in which the placenta happens to be completely detached, and the child left in utero, is, I believe, of a totally different kind. But, in order to understand it, let me first premise, that obstetric pathologists are in all probability incorrect in the rationale which they currently give of the immediate source of sanguineous discharge, in instances of flooding—whether accidental or unavoidable—from partial separation of the placenta.

Anatomical Source of the Hemorrhage in Detachment of the Placenta.

From the time of Guillemeau downwards, accoucheurs seem to have generally believed, that in cases of unavoidable and accidental hemorrhage, arising from the greater or less separation of the placenta, the blood that is effused escapes from the vascular maternal

[1] See the details of this case already given and commented upon at pp. 203 and 204.

[2] "About a pound." Case 43. See p. 190.

orifices that are left uncovered, and exposed upon the internal surface of the uterus, when the placenta is detached from that surface. Thus Guillemeau, in writing on the subject, states :—"The surest and most proper mode of assisting a woman when the afterbirth presents at the passages, is to deliver immediately (*délivrer soudainement*). This is the more necessary, from there being usually a constant flow of blood, owing to the *mouths of the veins that are situated in the walls of the uterus* (those, namely, to which the placenta was united) *being open*, and as the uterus contracts in order to expel the infant, it squeezes out the blood that is contained in these vessels, and which is attracted to them by the heat and pain." [1]

Mauriceau entertained precisely similar views. "When flooding," he observes, "happens to a woman truly conceived, at whatsoever time it be, it proceeds likewise from the opening of the vessels of the fund of the womb, caused by some blow, slip, or other hurt, and chiefly because the secundine in such cases, and sometimes in others, is separated in part, if not totally, from the inside of the bottom of the womb, to which it ought to adhere, that it might receive the mother's blood appointed for the infant's nurture, by which separation, it *leaves open all the orifices of the vessels where it was joined, and so follows a great flux of blood*, which never ceaseth (if so caused) till the woman be brought to bed : For the secundine being once loosened, although but part of it, never joins again to the womb to close those vessels, which can never shut till the womb hath voided all that it contained : For then, compressing and closing itself, and, as it were, entering within itself (as it happens presently after delivery), the orifices of the vessels are closed and stopped up by this contraction, whereby also this flooding ceaseth, which always continues as long as the womb is distended by the child, or anything else it contains, for the reason aforesaid." [2]

In another part of his work Mauriceau again states—"But the coming first of the burden is yet much more dangerous ; for, besides that the children are ordinarily still-born, if they be not assisted in the very instant, the mother likewise is often in very great peril of her life, because of her great floodings which usually happen when it is loosened from the womb before its due time, *because it leaves all the orifices of the vessels open to which it did cleave*, whence flows incessantly blood, until the child be born." [3]

[1] Guillemeau, *Les Oeuvres de Chirurgie*, p. 320.

[2] Mauriceau, *Diseases of Women with Child and in Childbed*, p. 87 of Chamberlen's translation.

[3] *Ibid.*, pp. 218, 219.

The opinions expressed in the above quotations from Guillemeau and Mauriceau, have been generally adopted by obstetrical authorities up to the present time. Thus, the writer of the last work published upon Midwifery in Great Britain (Dr. Lee of London) states, when discussing the pathology of accidental and unavoidable hemorrhage—"It is from the great semilunar, valvular-like, venous openings in the lining membrane of the uterus, which we have seen in various preparations, and from the arteries which are laid open by the separation of the placenta, that the blood *alone* flows in uterine hemorrhage."[1]

When the placenta is partially separated from the uterus, there are two surfaces left exposed by that separation—namely, a portion of the internal surface of the uterus, and a portion of the external surface of the placenta. According to the usual explanation, such as I have above shown it to be, the hemorrhage is supposed to proceed from the first of these exposed surfaces, namely that of the uterus. On the contrary, I am assuredly of opinion that it chiefly, and, in most instances, entirely, proceeds from the other surface, namely that of the placenta. I feel quite convinced that the pathological opinion on this point advocated by the late Professor Hamilton is the correct explanation. After citing the opinions of Drs. Ramsbotham, Davis, Dewees, and Ingleby, in reference to the origin of the hemorrhage from the exposed uterine surface in unavoidable and accidental floodings, Dr. Hamilton observes :—"Many other authorities may be quoted to prove the common opinion upon this subject ; and yet the author, from the earliest period of his professional life, has been anxious to show, that the hemorrhage in these cases proceeds from the separated portion of the placenta more than from the ruptured uterine vessels."[2]

To understand the true source of the flooding in unavoidable and accidental hemorrhage, the cause of its continuance when the separation of the placenta is partial, and the mechanism of its arrestment when that separation is complete, we must take into consideration the following different points :—*First*, The maternal portion of the placenta is of a cavernous structure ; that is to say, it consists of a series of maternal vascular cells, or dilatations, or, perhaps more properly speaking, of one large maternal vascular bag, into which the blood of the mother is conveyed by the utero-placental arteries, and from which it is removed by the utero-placental veins. *Secondly*,

[1] *Theory and Practice of Midwifery*, 1844, p. 361.
[2] *Practical Observations*, second edition, p. 312.

The vascular maternal cells, or immensely dilated capillaries which contain the blood of the mother in the placenta, communicate so freely with each other throughout all the different portions of the organ, that the blood which has access into one part, may in this way be rapidly diffused into the other portions of the placental mass. And, *Thirdly*, The deciduous or uterine surface of the placenta has no vital, muscular, or contractile power, by which it can constrict the orifices of the vascular tubes which pass from the uterus into it, when these tubes are ruptured in consequence of a greater or less detachment of the organ from the interior of the uterus.

Cause of the Continuance of the Hemorrhage, when the Detachment of the Placenta is partial. Explanation of its occasional Cessations.

From the consideration of these premises, it will readily appear, that when a small portion of the placenta is detached, it occasionally occurs, as I have already shown in the early part of the present Essay, that the consequent hemorrhage is sometimes so great as to be dangerous, or even fatal, in its extent. Its amount, under this and other circumstances, may be also regulated and increased by the occurrence, in consequence of uterine contraction,[1] or otherwise, of any *laceration* in the detached portion of the placenta itself; for when the substance of the organ is torn, its vascular maternal cells will be more freely opened into and exposed, and a more profuse discharge be allowed to issue from them. We may further easily conceive why the discharge should sometimes be actually more abundant when the detachment of the placenta is slight, than when it is greater in degree. For the quantity of blood passed into the maternal vascular structure of the organ, and consequently the quantity liable to escape from its unattached surface, will, in some respects, depend upon the extent of vascular placental connection which continues between it and the uterus. In other words, the intensity of the resulting hemorrhage will be regulated as much, or more, by the extent of placental surface which *still* remains in attachment to the mother, as by the extent of surface which is *already* detached; for the freedom with which the blood is supplied

[1] See illustrative cases in Smellie's Collection, vol. iii. p. 411 (the placenta "split in the middle"); and Ibid. vol. ii. p. 217 ("the placenta adhered to the os internum, near its middle, or thickest part, in which part I perceived a *laceration* upwards of an inch long, and penetrating almost through the substance of the placenta"). In both these cases the mothers died of the excessive flooding before delivery, and the condition of the placenta was ascertained on post-mortem examination.

to the placenta will affect the violence of the flooding, equally, or more so, than the freedom with which that blood is allowed to escape from the open orifices of its ruptured vessels.

Probably, in most cases, the hemorrhage will reach its maximum when the quantity of blood which enters the placental cells by the adherent portion is equal to what can reach, and escape from, the open orifices of the separated portion. Any additional separation after this will tend rather to diminish the flooding, as less blood will be carried into the placenta, from the number of its channels of supply being diminished. Most accoucheurs seem to believe that the greater the degree of detachment, the greater will be the hemorrhage, and hence, we are earnestly cautioned,[1] in the operation of turning in placenta prævia, not to separate more of the placenta from the cervix uteri than is absolutely necessary to permit of the passage of the hand. Theory as well as experience would seem to throw the greatest doubts upon the soundness and propriety of this rule. If at all true up to a certain extent of separation, it certainly does not hold good in regard to the detachment when carried to some degree farther.

There is an additional anatomical reason why the accompanying hemorrhage should be excessive, in some cases where a very small portion only of the edge of the placenta has been separated. I have already quoted from Dr. Hamilton a case of this kind, which proved fatal, and where the "area of the separated placenta was less than a square inch."[2] The largest of the maternal vessels belonging to the placenta is that which Meckel, Jacquemier, and other authors, have described under the name of the circular sinus of the organ. It courses round the circumference of the placenta, in some parts being of a great size, and at other points more or less contracted, or even absent. I have usually found this maternal placental vessel of great dimensions in several different parts of its course. In the cases in which excessive hemorrhages occur, when a small portion only of the edge of the organ is detached, I believe the danger and fatality of the result are to be ascribed to the fact, that some portion of the course of this large circular sinus has been

[1] As by Rigby, *System of Midwifery*, p. 262: "The less we separate the placenta, the less will be the hemorrhage;" Ramsbotham, *Obstetric Medicine*, p. 393: "The profuseness of the discharge will be principally regulated by the degree of separation." See also Levret, *Accouchemens Laborieux*, p. 68; Hatin, *Cours d'Accouchemens*, p. 178; Lachapelle, *Pratique des Accouchemens*, tom ii. p. 440, etc. etc.

[2] *Practical Observations on Midwifery*, 2d edition, p. 314.

opened, and thus a rapid and free tide of maternal blood allowed to escape from the disrupted part of this uncontracting tube.

In all instances, then, of hemorrhage from partial separation of the placenta, I hold that the blood issues principally, if not entirely, from the uncontracted and uncontractible maternal orifices that belong to the external surface of the separated portion of the organ, and that the maternal blood is supplied more or less freely to these orifices, in consequence of the free communication existing among the different maternal cells, and from these cells being kept filled with blood through the utero-placental vessels of that portion of the placental mass which continues to remain fixed and attached to the uterus.

Further investigations will probably show, that the greatest quantity of blood that escapes, flows from the exposed orifices which lie nearest to, or are actually involved in, the line of separation between the placenta and uterus. Along this line of separation, and in its immediate neighbourhood, these orifices—consisting mainly of apertures in the large and torn *decidual* veins—will be for a time kept more stretched and patulous than in the other portions of the detached surface, and more especially will this hold true if there exist any tendency in the uterus to detach itself more and more from the placental surface along this line of junction by constant contractions. Under such circumstances the placental orifices alluded to, and those in their immediate vicinity, will afford, not only the freest, but also the nearest, channel for the discharge of the mother's blood flowing into its maternal cells.

In cases of partial detachment of the placenta from the interior of the uterus, the attendant degree of hemorrhage is also, no doubt, regulated by another important circumstance—namely, by the condition of the blood itself in the separated portion of the organ. If the blood in the maternal cells of that portion continues still to remain fluid, it will be ready to escape from every ruptured orifice upon the detached placental surface. Hence, when a considerable portion of the placenta is at once and suddenly separated, the discharge is sometimes excessive, until the blood in the tissue of the detached part becomes more or less coagulated. Gradually, by its coagulation and infiltration into the structure of the separated portion of the organ, it obstructs the maternal cells of that part, and consequently more or less completely arrests the discharge.

It is in fact to this infiltration and coagulation of blood in the

detached portion of the organ, that we are, as Gendrin[1] has well shown, to look for an explanation of the occasional temporary cessations of those floodings which are so frequently observed during the latter periods of utero-gestation, in cases of placenta prævia. It is well known, that when the placenta presents, hemorrhage is liable to occur at intervals, for days and weeks, or even for months, previously to the completion of the full term of pregnancy. Each of these hemorrhages depends upon a partial detachment of the expanding surface of the *cervix uteri*, from the unexpanding surface of the placenta. For the expansion of the cervix uteri, during the last periods of pregnancy, is known to produce its detachment from the placenta, when the placenta is implanted upon it, exactly in the same way as the contractions, or rather retractions, of the same part during labour, lead to a similar result.

Each partial detachment occurring during pregnancy gives rise to the exposure of a greater or less number of vascular placental orifices, and consequently to a greater or less degree of hemorrhage from these orifices. Each of these hemorrhages generally ceases after a time, and the mechanism of their cessation is not so much to be found in any changes in the corresponding part of the uterus, as in the changes I have adverted to as occurring in the separated portion of the placenta. The blood becomes infiltrated and coagulated in the substance, and occasionally also upon the surface, of this separated portion; its vascular maternal cells are thus rendered impermeable; and the temporary arrestment of the flooding is consequently effected. The blood diffused and infiltrated into and upon the detached portion of the placental structure, undergoes a series of changes which I have elsewhere attempted to trace minutely;[2] and, after a time, the separated and ecchymosed tissue of the placenta itself becomes yellowish and atrophied, partly from the alterations which occur in the blood infiltrated through it, and partly from the obliteration of its vessels, and the consequent degeneration and desiccation of its tissues. In cases of placenta prævia, in which there has been a repeated recurrence of hemorrhage, and as frequently an arrest of it, we can occasionally trace in the placenta, after its expulsion, different parts of it, showing a series and gradation of pathological changes arising from successive partial detachments, and successive apoplectic infiltrations and

[1] *Médecine Pratique*, tom. ii. p. 216.

[2] See Pathological Observations on the Diseases of the Placenta, in the *Edinburgh Medical and Surgical Journal*, April 1836, p. 275.

obliterations of its substance from coagulated blood of different ages lodged in its structures. These alterations are confined to the detached portion, and the part always presenting the most recent stage of the pathological changes in question, is that lying nearest the line of junction between the separated and affixed divisions of the organ. The part showing the most advanced stage of the changes will be found situated farthest from this point; or is, in other terms, the part which was first and earliest detached. In cases of direct and central implantation of the placenta over the os, the centre of the organ, having in general become first detached, will be found to present the oldest morbid alterations; and the newer forms and phases of it may be sometimes traced in successive departments or layers, from this to the circumference of the detached portion—always supposing there has previously occurred a succession of detachments and attacks of hemorrhage. If the edge only of the placenta has presented—and several successive hemorrhages have in the same way taken place previously to labour—the same series of morbid changes will be found in the organ, running, not, as in the above instance, from the centre towards the circumference, but from the presenting or earliest separated point of the edge more or less towards the centre of the mass.

As affording some proof of the correctness of the view which I have already ventured to give of the immediate source of the discharge in unavoidable hemorrhage, I would beg to dwell for a moment on one other point:—Almost all obstetric authors mention, as a mark of diagnosis during labour, between unavoidable and accidental hemorrhages, that in the first or unavoidable species, the flooding is greatest during the pains, and least during the intervals; whilst in the last, or accidental form, the discharge is least during the pains, and greatest during the intervals. In placental presentations, "the character of the hemorrhage," says Dr. Rigby,[1] "is also different from that of common hemorrhage, inasmuch as it increases during a pain, and diminishes or ceases during the intervals, whereas in hemorrhage under ordinary circumstances it is the reverse." I am not aware that any solution has been hitherto attempted of this peculiarity in unavoidable hemorrhage. And, whilst it seems very inexplicable upon the idea generally received that the discharge comes from the exposed surface of the uterus, it is a condition which we might have *a priori* anticipated from the opposite opinion, that the effusion flows from the detached surface of the placenta.

[1] *System of Midwifery*, p. 255.

For, if in placenta prævia the hemorrhage proceeded from the vascular orifices laid open on the interior of the uterus, it ought to be diminished and not increased in quantity during the pains, as these orifices will necessarily be temporarily diminished under the contraction of the uterine fibres. If we adopt, however, the other view, that the discharge proceeds from the open vascular orifices existing on the outer or maternal surface of the detached portion of placenta, we can easily understand how its amount should be temporarily augmented by each labour pain. For each uterine contraction, in pushing down the presenting part of the child against the compressible placental mass, will squeeze out from its maternal cells, as from a sponge, a portion of the fluid blood contained in them; and hence, during the pressure, an increased flow of this blood will issue from the vascular orifices opening upon its detached surface. During the intervals between the pains, a re-accumulation of maternal blood will take place in the interior of the placenta; but the quantity actually escaping will be comparatively less, till again it is forced out in accumulated amount by the compression to which it is subjected by a returning pain.

Cause of the Cessation of the Hemorrhage when the detachment of the Placenta is complete.

All the preceding remarks apply to the mechanism of unavoidable hemorrhage, and its arrestment, when the placenta is partially separated. Their application to the rationale of the complete arrestment of the hemorrhage, in those instances in which the placenta is *completely* detached, is still more obvious and simple. For, if the explanation which I have above given of the source of the hemorrhage in partial detachment of the placenta, be true—namely, that it proceeds principally, if not entirely, from the maternal vascular cells belonging to the separated portion of the organ being still, more or less freely, supplied through the utero-placental vessels of the adhering portion—we can further easily understand how it occurs, that the attendant hemorrhage is immediately moderated, or entirely arrested, when the placenta is once thoroughly and perfectly separated from the interior of the uterus, as in the class of cases which form the subject of the present memoir. If the flooding proceeds, as I have endeavoured to show, from the detached and exposed surface of the placenta, and not from the detached and exposed surface of the uterus, the placenta must cease to yield any new or additional quantity of maternal blood, as soon as its own vascular connections

with the mother are destroyed ; or, in other words, the immediate source of supply of the hemorrhage is cut off, and its continuance consequently prevented, as soon as the placenta is entirely separated from the interior of the uterus.

Besides the preceding *anatomical* considerations, we must take some important *physiological* points into consideration, in investigating the mechanism of the complete cessation of unavoidable hemorrhage upon the complete separation of the placenta. The uterus, during pregnancy, has, like other organs under high vital periodic activity, both its arteries and veins, but especially the latter, enormously enlarged. The immediate and final object of this great enlargement is to supply the necessary materials for nourishment and respiration to the included fœtus. The medium through which these materials are supplied to the fœtus is the placenta ; and the maternal cells of that organ form the more immediate locality in which they are transmitted from the maternal to the fœtal system. We have already stated that these maternal placental cells are merely dilated capillaries, inasmuch as they constitute the only vascular connection between the terminations of the utero-placental arteries and the origins of the utero-placental veins. The capillaries, especially of those parts and organs which are liable to periodic excesses of action, are allowed to have a power of producing, under these excesses of action, an increased determination of blood to themselves and their corresponding arteries and veins, and that quite independently of any change whatever in the central organ of the circulation.[1] This seems to hold true to a great and remarkable degree with regard to the maternal form of capillary circulation carried on in the placenta, in consequence of the great and remarkable functions which this temporary portion of capillary circulation is destined to perform. And if the organic relations of the placenta to the uterus are disturbed, the resulting deviations are equally striking. If the placenta is only partially detached, the "attractive" power of the maternal circulation in the organ is, with the other moving powers of the blood, generally sufficient to keep the cells of the detached, as well as those of the adherent, portion filled with blood ; and at the same time the circulation in the uterine arteries and veins in the immediate neighbourhood continues to be

[1] "The capillaries possess a distributive power over the blood, so as at least to regulate the local circulation, independently of the central organ, in obedience to the *necessities* of each part."—See note in Mr. Palmer's admirable edition of the *Works of John Hunter*, vol. iii. p. 332.

more or less vigorously maintained, in consequence of their contiguity to the free tide of communication that is carried on between the uterine vessels and the part of the placenta that still remains affixed. Hence, probably, even the orifices of the congested and enlarged uterine veins opening on the interior of the uterus, and lying near the existing line of junction between the uterus and the placenta, may occasionally allow of some discharge, in addition to the freer form of flooding that we have seen to take place from the more patulous apertures left on the exposed surface of the placenta itself. But separate entirely and completely the placenta from the uterus, and then you at once alter the course—as you have at once removed the great physiological aim and object—of the utero-placental circulation. The blood in the uterine vessels being now no longer attracted by the maternal capillary system of the placenta, and so far the *distributive* influence of that system being completely and suddenly abrogated, there is not only a less absolute tide of blood determined towards the uterus, but that which is contained in its vessels seeks the freest and most patent course backward to the heart through the higher and larger communicating branches between the uterine arteries and veins. The placental capillary influence no longer *turns aside* from these channels, the direct and onward course of the circulating current into its own set of special uterine vessels. These special vessels, now that their function is arrested, are comparatively empty of blood, and their collapsing or collapsed sides may serve to keep the general vascular current in its proper canals; for the hemorrhage, if any, is from venous orifices, and hence easily repressed by slight impediments; and we shall afterwards see that it is not a direct discharge, but arises from retrogression or regurgitation of the blood in the venous tubes.

I might add, if it were necessary, some analogous instances in illustration of these opinions. The case of a limb suddenly and completely avulsed by machinery, or otherwise, might be shown to be similar in most points. Every one knows how slight the hemorrhage generally is, which is met with in connection with this severe accident. But another illustration may be regarded as more apposite. The fœtus has a circulation of blood to and from the placenta through its umbilical vessels, in the same way as the mother has a circulation to and from the placenta through its utero-placental vessels. We have found as a general law, that when the utero-placental vessels are entirely and totally divided by the complete detachment of the placenta, the mother has little or no

tendency to lose blood from their exposed extremities. When the umbilical vessels are divided, the fœtus has as little tendency to lose blood from their divided extremities, if once the vicarious *function* of the pulmonary respiration is freely established.[1] In the one instance, as in the other, the circulation through the divided vessels is stopped, and their tendency to bleed is arrested as soon as the *physiological* conditions which called these vessels into existence and action is completely arrested or superseded, and that though some *anatomical* conditions of its vessels, apparently favourable to hemorrhage—particularly the presence of a large venous tube or tubes unprovided with valves, and admitting of regurgitation—may be still found persisting.

Absence of Hemorrhage in Twin Labours, with one or both Placentæ entirely detached before the Birth of the Second Child.

There is another series of cases which, if my present space permitted, might be adduced at length, both in corroboration of the

[1] In reference to this point it may be necessary to state two facts. *First*, It is generally acknowledged by physiologists, as the result of various observations, that immediately after the child is born, the umbilical vessels cease to pulsate and carry blood, if the pulmonary respiration becomes active; and if the pulmonary respiration is by any cause interrupted or arrested before the cord is divided, the circulation through the umbilical vessels again becomes more or less active. *Secondly*, There seems to be very little danger of hemorrhage from the umbilical vessels after the division of the cord, if previously to that division the pulmonary respiration be allowed to become completely established. Hence various practitioners have gone so far as to aver, that it is unnecessary, as a general rule, to place a ligature upon the fœtal extremity of the cut umbilical cord, the tendency to bleed directly through its arteries, or indirectly by regurgitation through its veins, being so slight as not to require it, if the cord be not cut till the child has cried loudly, and the lungs are in full and free action. See, in support of this opinion and practice, Dehmel, in Haller's *Dissertationes Anatomicæ*, tom. v. p. 607; Koltschmid, *De intermissâ Funiculi Umbilicalis Deligatione non absolutè lethali*, Jena, 1751; Schweikhard, *De non necessariâ Funiculi Umbilicalis Deligatione*, Argent. 1769; Carboue, *Journal Général de Médecine*, tom. iii. p. 334; Van der Eem, *De Artis Obstetricæ Hodiernorum præ Veterum Præstantiâ*, in Schlegel's *Sylloge Operum Minorum in Arte Obstetricâ*, tom. i. p. 94; Ziermann, *Die naturgemasse Geburt des Menschen*, etc., Berlin, 1817. C. Martin, in a *Thesis* published some years ago at Munich, *De Ligaturâ Funiculi Umbilicalis*, maintains (p. 11) that the practice of tying the fœtal extremity of the cord is not only useless, but hurtful, and denounces its adoption as a reprehensible crime propagated down to our times, *facinus damnandum ad nostra usque tempora propagatum*. "Whatever," observes Velpeau, "may be the explanation, it always happens, that if it is left to itself and without ligature, the cord would very rarely expose the fœtus to any hemorrhage, or to any accident, even if it were clean cut, and not bruised or torn."—*Traité des Accouchemens*, tom. ii. p. 566.

fact, that the complete separation of the placenta is not followed by hemorrhage, and in evidence of the special explanation of the cessation of the flooding which I have above offered. I here advert to cases of twins, in which it occasionally occurs, that, after the birth of the first child, and before the birth of the second, one or both of the remaining placentæ are expelled, and yet no hemorrhage follows. Such cases may be arranged under three divisions, namely—

1. *Twins, in which, after the birth of the first child, its own placenta is expelled or removed, the other infant and placenta remaining, without flooding, for a greater or less length of time in utero.*—"When a woman," says Mauriceau, "has a plurality of children, we must not deliver the placenta till after the birth of the last infant; because there would be produced a great discharge of blood (*une grande perte de sang*) if we thus detached the placenta prematurely."[2] Dr. Denman adverts to this subject in language implying similar theoretical doubts upon the point, and yet, at the same time, affording practical confutation of it. "When," he remarks, in his observations upon twins, "the placentæ are separate, that of the first child should not be extracted before the birth of the second child, as a discharge of blood must *necessarily* follow, and perhaps a hemorrhage; though sometimes one placenta has been discharged before the birth of the second child, without any material loss of blood. In some cases of hemorrhage, when there was only one child, the placenta has been expelled before the child, without any detriment, though not without much apprehension of danger."[3] "I have seen," Dr. Collins observes, "several instances where the placenta of the first child came away without interference before the birth of the second, and yet there was no hemorrhage of any consequence."[4] Several cases of a similar kind have been reported to me by different

[1] See Proceedings of Edinburgh Obstetric Society, December 22, 1847—*Edinburgh Monthly Journal*, March 1848, p. 692.

[2] *Aphorismes touchant la Grossesse*, etc., No. 214.

[3] *Introduction to the Practice of Midwifery*, p. 541.

[4] *Practical Treatise on Midwifery*, p. 312. Dr. Collins adverts to two hospital cases. The two following similar cases occurred to him in private practice :—

1. "C. S. was delivered of twins, June 21, 1823. The placenta of the first child was expelled immediately. The feet of the second were then found in the vagina, and brought down. *There was not the slightest hemorrhage.* The first was born alive, the second putrid."

2. "M. C. was delivered of twins, May 6, 1823. The placenta of the first child was expelled before the birth of the second, *without hemorrhage.* Both children were born alive at the full period."—See *ibid.* pp. 312, 313.

professional friends.[1] They all tend to give a direct contradiction to the observation of Caseaux—the author of one of the latest and best French works on midwifery—that the complete detachment of the afterbirth of the first child "would expose the woman to a fatal hemorrhage (*exposerait la femme à une hémorrhagie mortelle.*")[2] In his work, Peu even ventured to suggest it as a proper mode of practice, in some cases, to remove the first placenta, when ascertained to be quite isolated, before the birth of the second child. "When there is," he observes, "more than one child, the method ordinarily followed is to receive the one that presents first, the cord of which should serve as a guide for the others. The fingers are slipped along it to the mass of the placenta, to discover if it is absolutely separated from the other placentæ. In this case, which is sufficiently rare, one may draw it out immediately."[3]

It may be objected to these twin cases, as corroborative of the fact for which I adduce them, that the distended bag of the membranes of the remaining child might prevent any hemorrhage by acting as a sufficient compress upon the whole uterine surface laid bare by the detachment of the placenta of the infant already expelled. But this objection will not hold good with respect to twin cases included under the two divisions which I have next to speak of.

2. *Twins, in which, after the birth of the first infant, the placenta of the second child was expelled, one infant and placenta remaining still in utero.*—A case of this kind has been related to me by my friend Dr. Andrews, Lecturer on Midwifery at the Westminster School. One of his pupils was in attendance. A placenta was expelled after the birth of the first child. Little or no hemorrhage occurred till the second infant was born, some time afterwards. It was found that the previously expelled placenta belonged to it, and the still retained placenta belonged to the child that had been first born. Here, in a case of twins, we had a child and a placenta remaining in utero, but the remaining placenta was not the placenta of that

[1] Thus, "I have seen," Dr. Dawson of Newcastle writes me, "two cases of twins, where the placenta of the first came away before the birth of the second child. There was *no hemorrhage* in either case. Mr. Sang," Dr. Dawson adds, "has met with two cases of this description, and also *without hemorrhage.*" A case of the same kind, and with the same result, occurred some time ago to Dr. Dickson, one of my own pupils. Dr. Fenton, Dr. Campbell, and others, have related to me similar instances.

[2] *Traité de l'Art des Accouchemens*, Paris, 1841, p. 785.

[3] *Pratique des Accouchemens*, p. 208.

child. And the placenta which was previously detached and separated had necessarily torn asunder the bag of membranes, leaving the portion of uterine surface to which it was itself affixed exposed, without that exposure leading to any marked degree of hemorrhage.

3. *Twins, in which, between the birth of the first and second child, the placentæ belonging to both were expelled.*—Dr. Dewar of Dunfermline has reported to me two cases of this kind. In one "the placentæ were firmly united, and were discharged after the birth of the first child. There was *no* unnatural discharge of blood. The mother did well." This case occurred in the practice of Dr. Brown. The other occurred under Dr. Dewar's own observation. "The mother had borne several children. The first child, which was at the full time, presented by the feet, and immediately after its birth the two placentæ, connected by a membranous but not vascular band, were expelled. Labour followed briskly, and in little more than five minutes the second child, which presented naturally, was born. *The hemorrhage*," Dr. Dewar adds, "*was very slight*, and not greater than what occurs after some ordinary labours. The mother did well."

It may be considered that, in these two cases, the interval between the expulsion of the placenta and the birth of the child was too brief to allow accurate observations to be made upon the degree of existing hemorrhage. This objection is completely answered by a third case of the same kind mentioned to me by my friend Dr. Protheroe Smith of London. "I was," he writes to me, "called to a patient some time since who had given birth to one child, immediately after which a large double placenta followed *without hemorrhage*, leaving a second child in utero, which was expelled, dead of course, *three or four hours afterwards, without further discharge of blood.*" Dr. Tyler published, two years ago, a similar case.[1] After the birth of the first child, a double placenta was discharged. Two hours afterwards, the shoulder of the second child was found presenting, and the uterus in a state of "hour-glass contraction." Many unsuccessful efforts to turn the fœtus were made. At last its thorax was eviscerated, and the breech brought down. The mother made a good recovery. "Here," observes Dr. Tyler, "we have a case not merely of simple placenta prævia, but a double surface exposed—there having been two placentæ; the fibres of the womb first in a state of rigid contraction; then the irritation consequent upon the performance of the embryotomy; and, lastly, a state of excessive

[1] *American Journal of the Medical Sciences* for October 1843; or, *Provincial Medical Journal*, vol. vii. p. 245.

relaxation, *and still not a drop of hemorrhage*, and the female entirely recovered."

Presence of Hemorrhage in Partial, and its absence in Complete, Detachment of the Placenta, in the Third or Last Stage of Ordinary Labour.

I have now referred, under the present section, to two separate sets of facts, illustrative of the non-supervention of hemorrhage after the complete detachment of the placenta from the interior of the distended uterus. We have seen that, both in the placental presentations and in twin labours, a large portion of the internal surface of the uterus may be left exposed by the entire separation of the placenta, while the organ continues distended by the presence of a remaining child, and yet the vessels of that exposed surface have little or no tendency to bleed, if the placental mass be only once completely detached from it. We have further seen, that if, in the same cases, the placenta be only partially separated from its uterine attachment, hemorrhage is generally present. The supervention of the hemorrhage, when the detachment of the placenta is partial, is probably not more certain than its cessation is when that detachment is perfect and complete.

Though these facts have escaped the general notice of obstetric pathologists, they have all been long familiar with a *third* set of instances in which the same phenomena may be observed. I refer to circumstances well known in connection with the last or third[1] stage of common labour, and after the child is born. When, during that period of the labour, the placenta happens to become only partially separated from the uterus—as in cases where a portion of it still remains firmly attached from morbid adhesion—hemorrhage is generally present. When, on the other hand, the placenta becomes totally separated from the interior of the uterus, either naturally or artificially, all hemorrhage generally ceases. In other words, we have the same consequences resulting from partial, as contrasted with complete, detachment of the placenta, in the last stage of labour, and when the uterus is comparatively small and contracted, as we observe under the same conditions in the earlier stages of parturition, and when the uterine cavity is still filled and distended by the

[1] In correspondence with the language of Denman, Hamilton, Ramsbotham, etc., I here use the words "third stage," as denoting the period intervening between the birth of the child and the expulsion of the placenta.

presence of an infant. Under these, at first apparently different circumstances, the general fact seems to be the same—namely, that hemorrhage is almost sure to occur if the placenta be only partially separated ; it is almost as sure to cease if the placenta be once fully and entirely detached.

Means by which Hemorrhage is prevented from the Venous Orifices left exposed on the Interior of the Uterus.

I have no intention at present to push the present investigation farther, and enter upon a full inquiry into this *other* remaining point —namely, by what special mechanism nature prevents the occurrence of hemorrhage from those patulous vascular orifices that are left on the interior of the uterus, when the placenta is, as in the instances we are considering, completely detached from its internal surface. The simple empirical fact of its non-occurrence is sufficient for *all the practical purposes* of the present essay. And I believe that the subject, if fully discussed, would form an anatomical and pathological problem that would require for its complete solution a much more laborious and lengthened series of researches than I can pretend at this time to afford to it. I have, however, but little doubt, that the means by which, in placental presentations, hemorrhage is prevented from the uterine vessels themselves after the detachment of the placenta, will be found in all its essential points to be the same by which flooding is prevented after the removal of the placenta in the ultimate stage of common labours. The non-occurrence of hemorrhage from the uterine vessels in this last state, or after the complete detachment of the placenta in ordinary parturition, is probably not explicable, as is generally imagined, upon the sole circumstance of the simple and absolute contraction that occurs in the uterine fibres after delivery. We know, from the observations of Gooch,[1] Velpeau,[2] Rigby,[3] and others, that post-partum hemorrhage sometimes

[1] *Medico-Chirurgical Transactions*, vol. xii. p. 157. "The observing practitioner must," Dr. Gooch observes, "have been frequently struck by the little proportion that existed between the want of contraction and the degree of hemorrhage ; having found the uterus bulky without any hemorrhage, and a profuse hemorrhage without greater bulk of uterus. Nay, further, I have witnessed a profuse hemorrhage, though the uterus had contracted in the degree which commonly indicates security ; and I have ventured to do what is seldom justifiable, separate the placenta before the uterus had contracted, without more hemorrhage than after a common labour. What is this circumstance that has so great an influence that its presence can cause a moderately contracted uterus to bleed profusely, and its absence can cause an uncontracted uterus to bleed scarcely at all ?" —P. 152.

[2] *Traité de l'Art des Accouchemens*, tom. ii. p. 539.

[3] *London Medical Gazette*, vol. xiv. p. 332 ; and *System of Midwifery*, p. 218.

supervenes when the uterus appears contracted and reduced to its usual size after delivery. On the other hand, the facts that I have adduced in the preceding pages show that there is little or no tendency to hemorrhage after the perfect expulsion of the placenta, when this simple and absolute contraction of the uterine fibres is so far prevented by the presence in utero of a full-grown fœtus. When the child is born in ordinary labour, and the placenta happens to be retained from *want* of uterine contraction, hemorrhage does not necessarily supervene. It is well known that Ruysch, William Hunter, and others, adopted, for a time, the practice of leaving the placenta in utero for hours and days till nature herself threw it off, and that they were at last forced to abandon this line of treatment —not because uterine hemorrhage was liable to supervene, but because the dead and retained organ was found to become putrid, and to give rise to symptoms of severe irritation and fever. Again, after the complete evacuation of the uterus in common parturition, and the total removal of the placenta, hemorrhage does not necessarily supervene, though the uterine fibres are not in a state of firm contraction. We often find them alternately relaxing and contracting when after-pains supervene, and yet the general relaxation that is observable between the pains may not give rise to the slightest degree of flooding. Every practitioner has had occasion to watch, with more or less anxiety, the uterus remaining of considerable size and softness for some time after delivery, and consequently with its fibres not firmly contracted, but without after-pains, and without hemorrhage supervening. In the same way I shall afterwards have occasion to show that in some cases of placental presentation after the placenta had become expelled, and while the child remained in utero, the labour-pains have ceased; and still, notwithstanding this cessation, not only has no hemorrhage followed, but, on the contrary, the flooding that previously existed has immediately ceased.

Such instances prove that strong uterine contractions in the special complication which forms the subject of our observations, are not probably so essential a part in the mechanism of the prevention of hemorrhage from the open orifices of the uterine veins as we might *a priori* suppose. When hemorrhage does continue after the expulsion or extraction of the placenta in placental presentations, the determining cause of the hemorrhage is probably the same as gives rise to this accident in the last stage of labour, and after the complete evacuation of the uterus. In two cases, which have been already quoted at length, and where, in placental presentations, the

hemorrhage remained after the complete expulsion of the placenta, the child being retained in utero, the flooding still continued also for a time after the infant was extracted, and the uterus was completely emptied. The same circumstances—whatever they may be—in all likelihood led to its recurrence under both of these conditions.

No doubt the occurrence, after delivery, of great and decided atony in the whole muscular system of the uterus, does assuredly give rise to post-partum hemorrhage; and the same antecedent condition may be the cause of the continuation of the flooding in some circumstances where this happens after the expulsion of the placenta in placenta prævia. But if I may judge from my own observations, I would venture to remark, that the morbid condition which is most frequently and earliest seen in connection with post-partum hemorrhage, is a state of irregularity and want of equability in the contractile action of different parts of the uterus—and, it may be, in different planes of the uterine fibres—as marked by one or more points in the organ feeling hard and contracted, at the same time that other portions of the parietes are soft and relaxed—and by the contracting and relaxing fibres slowly but frequently changing their relative situations.[1]

Upon the same principle, I believe, that in attempting to prevent or remove the morbid condition leading to post-partum hemorrhage, when it is functional in its nature, and not connected with any organic or traumatic causes, we ought to endeavour to produce not merely a certain degree and amount of uterine contraction, the great and primary practical point to which we always justly look, but also a certain equability and uniformity of contraction. The same may perhaps be found true, both pathologically and practically, in regard to the state of the uterus, after expulsion or extraction of the placenta before the child in placental presentations. At the same time, I would repeat, that this part of the subject, like the whole question of the manner and means by which hemorrhage is prevented from the exposed uterine veins, after every case of ordinary labour, stands, in my opinion, in need of new, careful, and extended investigations. I have, however, at present, no desire to encounter so wide and complicated an inquiry; and shall content myself with stating in reference to the subject the few following suggestions:—

[1] "I have rarely introduced the hand into the uterus in a case of flooding, without meeting with it (hour-glass or irregular contraction), whether the placenta had or had not been expelled."—Dr. Burns' *Principles of Midwifery*, 9th edition, p. 543.

First. Uterine hemorrhage, after the separation of the placenta, in any of the stages of the labour, is *not Arterial* in its character. The utero-placental arteries are numerous, but so long and slender[1] as to become readily closed—1, By the tonicity of their coats; 2, By contraction of the uterine fibres upon the course of these vessels themselves as they pass through and amid the uterine structure; and, 3, and principally, By the changes in their tissues produced by the mechanical rupture of their coats—torn arteries being little, if at all, liable to bleed—and the placenta being separated by a true process of avulsion.

Secondly. Hemorrhage, therefore, under the conditions supposed, is *Venous* in its source and nature. Further, it is especially important to mark that it is a *venous hemorrhage by retrogression.* The *forward* course of the uterine and utero-placental venous circulation is from the dilated maternal capillaries or cells of the placenta towards the periphery of the uterus, and the ovarian and hypogastric venous trunks. In uterine hemorrhage, the blood that escapes, instead of flowing onwards, regurgitates *backward* into the uterine cavity.

Thirdly. The mechanism by which, after the separation of the placenta, this retrograde course of the venous circulation towards the cavity of the uterus, so as to lead to hemorrhage, is *prevented*, is probably of a compound character, or is effected by different means. Each of these means may be more or less efficient under different circumstances and at different times.

Fourthly. The most powerful of these preventive measures consists in the uniform and regular contraction of the uterine fibres. By this contraction the canals of the supplying arteries are constricted, and the venous tubes or sinuses which more immediately yield the discharge are directly compressed. The facility of this compression of the sides of the veins, and the consequent diminution of their cavities, is promoted by the naturally thin, flattened form of their canals, and by the fact that the proper contractile tissue of the uterus forms their second coat—the uterine veins consisting of the usual lining membrane of the venous system placed in direct contact with the muscular tissue of the uterus. At the same time, it is to be recollected that there seems to be often no direct relation between the degree of uterine contraction and the degree of tendency to

[1] I speak of these utero-placental arteries as they are seen in the beautiful injected preparations of them left by William Hunter and the second Munro, and as I have myself observed them in recent specimens.

hemorrhage, for, as we have already seen—1. No hemorrhage may occasionally be observed after delivery, though the uterus is not contracted to its usual degree; and, 2. It may be present when the uterus is apparently well contracted. But, 3. There are, according to most anatomists, few or no *contracting* fibres in the structure of the os and cervix uteri, and certainly after delivery I have generally, if not always, found it remaining open, gaping, soft, and flaccid, even when the proper cavity of the uterus above felt shut and contracted, and its parietes hard and firm. Still, when the placenta is attached to the surface of this uncontracting portion of the uterus, hemorrhage is not common after its separation, unless some laceration of its vessels has occurred. Here we have post-partum hemorrhage prevented, *without* the contractile mechanism, generally considered necessary for its avoidance, being almost in existence. And lastly, in cases of spontaneous or artificial extraction of the placenta in some placental presentations and twin labours, the placental mass may be completely separated, and the uterus still remain distended by the presence of a child in its cavity, so as to prevent much contraction of its fibres, without hemorrhage occurring. The venous trunks running to the uterus are not supplied with valves, and under the above and other circumstances, by what means in addition to, or in substitution of, the contraction of the uterine fibres, does nature prevent the retrograde flow of venous blood into the uterine cavity—or, in other words, uterine hemorrhage?

Fifthly. The structure and mutual relations of the venous sinuses of the uterus seem calculated to obstruct and prevent such a retrograde flow of blood in their tubes as to cause hemorrhage. The uterine veins are large, but of a compressed, flattened form, and arranged in several planes or floors above one another in the uterine walls. On examining these veins in several pregnant uteri, by dissecting them from the outer or peritoneal surface of the organ, downwards towards the mucous, I have found the following arrangement:—Each venous tube gives off numerous communicating branches to the veins of its own plane or floor, by a set of *lateral* foramina. When, however, a venous tube of one plane comes to communicate with a venous tube lying in the plane immediately beneath it, the foramen between them is not in the *sides*, but in the *floor*, of the higher or more superficial vein, and the opening itself is of a peculiar construction. Looking down into it from above, we see the canal of the vein below partially covered by a semilunar or falciform projection formed by the lining membrane of the two

venous tubes, as they meet together at a very acute angle, the lower tube always opening very obliquely into the upper.[1] In the folds of these falciform projections, the microscope shows the common contractile tissue of the uterus. Do these semilunar or falciform projections, and the oblique communications of the lower with the higher planes of veins, allow the normal flow of venous blood from the deeper to the more superficial veins of the uterus, while, after the placenta is separated, they prevent that anormal or retrograde flow of it from the more superficial towards the deeper-seated venous tubes which would produce hemorrhage? Here I suppose it possible that these falciform processes may act upon the same principle as the Eustachian valve, but in a less perfect manner, while by the obliquity of the communications between the different planes of veins it may be that blood does not so readily retrograde into the deeper vessels, in the same manner as urine does not retrograde into the ureters from the bladder, in consequence of the oblique opening of the former into the latter. Do the uterine fibres seen in the venous falciform processes tend to aid this valve-like mechanism, by diminishing, under contraction, the apertures between the different planes of veins?

Sixthly. I have already shown that one cause contributing to prevent hemorrhage after the total separation of the placenta, is the abstraction from the uterine vascular system of the derivative or sugescent power of the maternal circulation in the placental cells, and the consequent tendency of the blood to flow in the more direct and freely communicating channels that exist between the uterine arteries and veins. Besides, the general and direct forward current of the blood along the course of these larger uterine veins diminishes, and, in a measure, destroys, the tendency which it might

[1] In the course of dissecting the veins of a pregnant uterus, in the sixth month, from the peritoneal surface downwards, Mr. Owen states that he "observed that where the veins of different planes communicated with each other, in the substance of the walls of the uterus, the central portion of the parietes of the superficial vein invariably projected in a semilunar form into the deeper-seated one; and where (as was frequently the case, and especially at the point of termination on the inner surface) two, or even three, of these wide venous channels communicated with a deeper sinus at the same point, the semilunar edges decussated each other, so as to allow only a very small part of the deep-seated vein to be seen. It need scarcely be observed how admirably this structure is adapted to ensure the arrest of the current of blood through these passages, upon the contraction of the muscular fibres with which they are everywhere immediately surrounded."—*Works of John Hunter*, vol. iv. p. 68. See also Mr. Goodsir's corroborative statement, in his admirable *Anatomical and Pathological Observations*, p. 61.

otherwise have either to flow backwards, or to escape by any existing lateral apertures of the vessels.

Seventhly. Among the other remaining means by which hemorrhage is more or less prevented after the detachment of the placenta, I may mention—1. The occasional presence of tufts of fœtal vessels left in the orifices of the uterine veins,[1] and forming not only immediate mechanical obstacles, but nuclei for the ready coagulation of the blood; 2. The formation of coagula in some of the collapsed venous tubes and orifices; and 3. The presence for some hours, or even days, after delivery, of the collapsed decidua over the apertures seen in the veins on the interior of the uterus.

To these few and imperfect suggestions I am desirous to add one remark. Some of the natural means of arresting uterine hemorrhage that I have spoken of admit of extended anatomical examination being applied to their more perfect investigation; and several of the observations that I have ventured to offer in this section may be yet proved or disproved, by being tested by direct experiments with vascular injections thrown into the dead body.

Section VIII.—Instances of Placental Presentations, in which the Placenta has been artificially removed before the Child; Warnings by Authors against attempting the Practice; Case of its Successful Adoption; Recorded Instances of it under supposed Mismanagement; Cases of Portal; Suggestion of Chapman; Modern Cases of Extraction, etc.

We have already found that various obstetric authors (see Section I.) have strongly declared the total inefficiency of nature in cases of placenta prævia. Several of them have especially warned us against attempting to imitate her in any of her modes of management of this obstetric complication, and against taking any hints from the principles of treatment which she seems to follow under the circumstances. Dr. Ramsbotham has, in his admirable *Observations on Midwifery*, reported several cases of placental presentations in which the placenta was expelled before the child. In commenting upon these cases, he remarks, "Although it satisfactorily appears that a spontaneous detachment of the placenta is not

[1] See, on this point, the observations of Professor Reid in his excellent paper on the Anatomical Relations of the Blood-vessels of the Mother and Fœtus—*Edinburgh Medical and Surgical Journal*, vol. lv. p. 8.

necessarily followed by fatal consequences, that fact can furnish no precedent in practice for the artificial separation and removal of it. I think," he adds, "that few practitioners, aware of the probable consequences, would have the temerity to make the experiment."[1] "It would," he again observes in another place,[2] "be the extreme of hardihood in any practitioner to attempt the artificial separation of this fœtal appendage in imitation of its natural expulsion." In a similar strain Dr. Burns, the distinguished author of the well-known *Principles of Midwifery*, observes, "There are, doubtless, examples where the patient has, by labour, been safely, and without assistance, delivered of the child, when part of the placenta has presented. Nay, there have been instances where the placenta has been expelled first, and the child after it. These examples are to be met with in collections of cases by practical writers, and some solitary instances are likewise to be found in different journals. It would be much to be lamented if these should ever appear without having, at the same time, a most solemn warning sent along with them, to the accoucheur, to pay no attention to them in his practice. I am convinced that they may do inexpressible mischief, by affording argument for delay, and excusing the practitioner, to himself, for procrastination. * * * These instances are not to be converted into general rules, nor allowed to furnish any pretext for procrastination. They happen very seldom, and never ought to be related to a young man, without an express intimation, that he is not to neglect delivery, when required, upon any pretence whatsoever. There is scarcely any malady so very dreadful as not to afford some examples of a cure effected by the powers of nature alone. But ought we, thence, to tamper with the safety of those whose lives are committed to our charge?"[3]

Notwithstanding the strong and decided opinions expressed by the above authors, and others who might be cited for the purpose, I became so convinced—from two cases which I happened to see, and from the study of others that I found upon record—that the extraction of the placenta before the child was the proper plan of treatment in some cases of placenta prævia, that, during the course of 1841, I laid before the Obstetric Society of Edinburgh the deductions derivable from thirty-nine cases that I had then collated, and proposed that the artificial separation of the placenta ought to be our line of practice in some instances of unavoidable hemorrhage.

[1] *Practical Observations on Midwifery*, Part ii. p. 193. [2] *Ibid.* p. 286.
[3] *Principles of Midwifery*, p. 367.

I was deterred at the time from publishing my investigations, under the fear that it would be considered rash in a young member of the profession, propounding from the data which I had, so great a revolation in the usual practice of placental presentations. In the course of the spring of 1844, I laid before the same Society an additional number of cases, with the view of supporting the same opinion. The data which I then had to found upon were not so extensive as those I have now brought forward, but they were to my mind so distinct and decided, that, notwithstanding the earnest counsels of Drs. Ramsbotham, Burns, and others, I predetermined to have recourse to the artificial extraction of the placenta itself, in any case that I should happen to meet with in which the hemorrhage was very great, and where the rupture of the membranes was insufficient, or the operation of turning dangerous or impossible.

It was not till last autumn that I met with an instance in point. And I hope I shall be excused for stating at length a case, which was to me so interesting in its nature and in its results.

Case XXIV.—*Great hemorrhage; rupture of the membranes insufficient; the os uteri not so dilated as to allow of turning; the placenta artificially extracted about two hours before the birth of the child.*—I was called to see the lady who was the subject of this observation, at about five in the afternoon of the 1st of October 1844. The gentleman who was in attendance upon her, Mr. Hill of Portobello, informed me on arriving that she was between the seventh and eighth month of pregnancy; that she had almost daily suffered from considerable discharges of blood, without pain, for about a fortnight previously; and that she had been flooding, with slight uterine contractions, for about ten or twelve hours before my visit. I found her a weakly person, with bleached features, and much sunk and prostrated by the preceding hemorrhage. The pulse was very small, soft, and compressible. The abdomen seemed much distended with liquor amnii. On examination, I found the vagina filled with coagulated blood. It was exceedingly difficult for me at first to reach the os uteri, partly in consequence of the rigidity of the parts, and partly from the very high situation of the os uteri itself. On touching the os uteri, I found it still very slightly dilated, and on passing the finger through it, it came in contact with the anterior edge of the placenta; the presentation being one in which the placenta was attached to the posterior lip of the cervix uteri, and so as to project over the os itself. Mr. Hill and I agreed together to allow the escape of the liquor amnii, provided I could reach and rupture the membranes. I was enabled to do so with some little additional difficulty; and immediately upon perforating the membranes anteriorly, an immense gush of liquor amnii took place, and the abdomen became comparatively smaller. I had hopes that I had done enough to arrest, in all probability, the hemorrhage under which the patient was evidently sinking. She got at the same time a large dose of the ergot of rye, and we waited with some impatience for the result. Stronger uterine contractions came on, and shortly afterwards I re-examined, in order to know their effect on the os uteri. I was distressed to find the vagina again filled with clotted blood, showing too manifestly that the rupture of the membranes, and the supervention of more powerful pains, had been anything but sufficient to

arrest the progress of the flooding. A small portion of the anterior part of the placenta was by this time threatening to protrude through the os uteri. I passed my finger by the side of it posteriorly, endeavoured to detach as freely as possible the organ, and then, seizing the protruded part between two fingers, I gradually and steadily pulled the whole mass downwards into the vagina, and through the vulva. After accomplishing this, I confess that for a few minutes I felt a degree of timidity at what most of my professional brethren would have at once denounced as a most improper line of proceeding on my part, and one in direct opposition to all the most approved and established rules in obstetric medicine. The result, however, was such as to answer my best expectations. All fears were dissipated, by ascertaining in a few minutes that there were no new clots, nor any new discharge of blood accumulating in the vagina, and that the head of the infant was presenting —a circumstance which could not be previously ascertained. The cervix, however, was still so undilated as to hold the head from impinging directly on the interior of the os uteri—a band of contracted fibres high up in the cervical canal acting as a shelf on which it rested.[1] The patient got an additional dose of ergot, and I cut through the umbilical cord, and separated the placenta for the purpose of ascertaining, by ocular inspection of the mass, if the whole of the organ had been extracted. It was for this purpose placed upon a plate nearly two hours before the labour was completed. The infant came down slowly, but without any additional hemorrhage. The mother made a perfect recovery. Her pulse, during convalescence, never, I believe, rose above 80.

In the preceding instance, I adopted the practice which I have detailed as a matter of principle and choice, and as a result of observation and reasoning upon the cases which I had previously seen and collected. In a number of other instances upon record, the same practice has been adopted through reputed ignorance, on the part of the attendant, of the established rules of midwifery in this variety of obstetric complication. The details, however, of some of these cases may both demonstrate the truth of the principle and practice which it is my wish to establish, and the practicability and propriety of the treatment itself. The first case I shall quote is from Dr. Collins' *Treatise*. He gives it as "an instance eminently calculated," to quote his own expression, "to show the marvellous escapes occasionally witnessed when the gross ignorance of the attendant blinds him as to the danger of his patient."

Case XXV.—*The placenta removed many hours before the birth of the child.*—"G. J., at her full time, was admitted in a state of extreme debility, her pulse so weak and frequent as not to be counted. The foot was found in the vagina, so putrid, that the skin peeled off on the slightest touch. The discharge was fœtid. Stimulants and cordials were freely given, and the child brought away without

[1] See an analogous and very interesting case of placental presentation, with the os uteri largely dilated, and stricture in the upper part of the crevix, recorded by Dr. James Reid, in the *London Medical Gazette*, vol. xvi. p. 145. Dr. Reid's case was further remarkable, as being one of those instances in which the placenta presented *without* any attendant hemorrhage.

difficulty. The uterus remaining enlarged and relaxed, the hand was passed to remove the placenta, when there was *none* to be discovered, nor was there any hemorrhage. The membranes had ruptured and been discharged a fortnight previous to admission, from which time, until the evening before she was brought to the hospital, she had had more or less hemorrhage. It was now ascertained that the placenta had been expelled the evening before her admission, and separated by the midwife in attendance. She had been twice visited by a medical practitioner, who bled her and gave her purgatives. She left the hospital well on the 13th day."[1]

Dr. Ramsbotham describes graphically, in words that demonstrate his own surprise, the following similar case :—

Case XXVI.—*Placenta extracted before the child ; the flooding arrested ; safety of the mother.*—"Late in the evening," observes Dr. Ramsbotham, "of Thursday, May 7, 1818, during a temporary absence from home, a message was delivered at my house, desiring me to see a woman at Wapping, who was said to be very ill, but of what disease, or in what state, was not mentioned. After some conversation between my servant and the messenger, it was agreed that I should visit this woman early the following morning. By seven o'clock on the Friday morning, a second message was sent to countermand the first, with the intimation, 'that the woman was better, and was doing well.' A few days afterwards, I accidentally met the medical gentleman, who had sent the above verbal message, and inquired the nature of the case upon which he wished to have my opinion a few nights before. To which he replied, 'It was the strangest case I ever saw ; it was a placenta presentation, with a most violent flooding ; but I *got it away*.' 'Got what away ?' said I : 'Why, the *placenta*,' answered he. 'What ! before the child ?' asked I : 'Yes, before the child,' said he ; 'and the flooding ceased, and the woman did well ; the child soon followed the after-birth.'"[2]

I am indebted for the following most interesting case to the politeness of Dr. Cripps of Liverpool, and shall relate it in his own words. Dr. Cripps' letter to me is dated 28th of December 1844.

Case XXVII.—*Placenta extracted ten hours before the child ; arm presentation ; no intervening hemorrhage.*—"I was sent for a few days ago, about 8 P.M., to see a poor woman who supposed herself to be at the early part of the last month of pregnancy with the third child. She had had occasional flooding to no great extent for a week previously. On the morning of the day on which I saw her, a surgeon had been sent for in consequence of the occurrence of several labour pains, together with a good deal of hemorrhage. This gentleman being out of town, his assistant went ; he remained with her during the day, and in the evening, finding things not going on so favourably as he wished, he sent for a friend of his employer's, who, soon after his arrival, sent for me. On making an examination, I found an arm down, which was much swollen, the pains very severe, I immediately gave one drachm of laudanum, and on their subsiding, turned without much difficulty. The funis was divided, only about four or five inches remaining, and appeared as though it had been cut. On expressing my surprise at this circumstance, I was informed that it was cut 'when the after-birth was taken away,

[1] *Practical Treatise on Midwifery*, p. 102.
[2] *Observations on Midwifery*, part ii. p. 231.

about ten in the morning.' Not believing it possible that such could be the case, there *having been no hemorrhage whatever from that hour until the period of delivery*, I searched for the other portion of the navel-string, but not finding it, and being again assured that 'the after-birth had come in the morning,' I introduced my hand into the uterus, and made a most careful examination ; it was contracting satisfactorily, but was perfectly empty. I watched her strictly until her complete recovery. I had every portion of discharge saved for my inspection, and am therefore perfectly satisfied that this is a case in which the placenta presented, and was removed ten hours previously to the birth of the child, and that, in the meantime, *there was no hemorrhage whatever.*"

The following brief notice of an analogous case, reported by Dr. Löwenhardt, is extracted from Kleinert's *Repertorium* for 1842, tom. vi. p. 58.

Case XXVIII.—*The placenta separated and pulled away before the child ; transverse presentation ; turning.*—"Some time ago, Dr. Löwenhardt of Prenzlaw met with a case where an ignorant midwife had separated the placenta, which presented all round, and removed it from the passages. She then discovered that the child was lying transversely, and, attempting to turn it, she brought down an arm into the pelvis instead of a foot. The uterus being fully contracted, it was with difficulty that the author accomplished the turning of the child, and saved the mother."

Many years ago, Baudelocque related, in a footnote, in the second volume of his well-known *System of Midwifery*, an instance of the same kind.

Case XXIX.—*Placenta extracted some hours before the child ; arm and head presentation.*—"A midwife had extracted the placenta some hours before I was called, and had not been able to turn the child, whose arm was engaged below the head. The uterus, irritated by the manœuvres of the midwife, was strongly contracted on the child, and discharged but a few drops of blood. Astonished, after the extraction of the child, to see the cord was torn off near the umbilicus, and more surprised still not to find the after-birth in the uterus, I discovered that it had been extracted a long time before my arrival, and carefully concealed."[1]

In the five cases, the particulars of which have been last given, the placenta was artificially extracted a considerable time before the birth of the child, in simple ignorance, and hence in defiance, on the part of the attendant, of the established rules of management in unavoidable hemorrhage. In the first case that I have detailed in the present section, I pursued, as I have stated, exactly the same practice, as a matter of election, and from the belief that, under the dangerous circumstances in which the patient was placed, this mode of treatment was the measure best calculated to suppress the extreme attendant hemorrhage, to gain time for the rigid cervix uteri to

[1] Baudelocque's *Midwifery*, Heath's Translation, vol. ii. p. 37.

dilate, and to place the mother in the greatest relative degree of safety.

We have already seen (p. 182), that all practical authors in midwifery insist upon the artificial extraction of the child by turning, as the principal or only means of treatment in placental presentations, more especially when the presentation is complete. Almost all of them take occasion also to inculcate, under some form or other, the supposed propriety of not detaching the placenta more than is absolutely requisite, when the operator introduces his hand into the uterus for the purpose of grasping the foot or feet of the infant. It is well known that, in order to follow out this principle to its fullest extent, various authorities advise that, either as a constant or occasional rule, the presenting part of the placenta should be perforated, rather than that more of the attachments of the placenta to the cervix should be separated during the operation ;[1] and at all events, if the hand is introduced between the cervix and placenta, it is to be passed to one side only, and in such a way as to produce as little detachment as possible between the two organs.

While all thus perfectly agree upon the general rule, that the child should be extracted before the placenta, at the same time a self-evident and necesssry exception to this practice is mentioned by Guillemeau[2] (who was himself among the first, if not the very first,

[1] For the practice of perforating the placenta, "the obvious reason," says Dr. Rigby, is, "that by this means not more of the placenta may be separated than is necessary for the introduction of the hand, and consequently that as little increase of bleeding as possible may be produced by the operation ; but if it be impracticable, as I have more than once found it, and it must ever be when the middle of the placenta presents to the hand, from the thickness of it near the funis, it must be carefully separated from the uterus on one side, and the hand passed, till it gets to the membranes."—*Essay on Uterine Hemorrhage*, p. 61. Dr. Foster inculcates the perforation of the placenta under all conditions as the best method of proceeding to turn in unavoidable hemorrhage.—*Principles and Practice of Midwifery ;* London, 1781, pp. 231-32. In one instance, Smellie tells us, he was obliged to employ it (vol. iii. p. 163). Richter, in his *Synopsis Praxis Medico-Obstetricæ*, p. 176, attributes the first recommendation of this practice to Deleurye and Mohrenheim. Deleurye (*Traité des Accouchemens*, p. 368) argues, on the contrary, strongly and sensibly against the practice. Mohrenheim did not publish his *Abhandlung über die Entbindungskunde* till 1791.

[2] *Les Œuvres de Chirurgie*, p. 320 ; Rouen, 1649. Guillemeau's rules for the management of cases of placenta prævia are so original, explicit, and brief, that I shall quote them here in full.—"Il faut observer deux choses. La *prémière* est de considerer si ledit arrière-fais est *peu* ou *beaucoup* advancé et sorty : car estant *peu* advancé (apres avoir bien situé la mere) il sera remis et repoussé le plus diligemment que faire se pourra ; et si la teste de l'enfant se presente, elle serra conduite droict au couronnement, pour aider à l'accouchement naturel. Mais s'il se

to inculcate the necessity of turning in placental presentations), and by Mauriceau,[1] Daventer,[2] Roederer,[3] Ould,[4] Pugh,[5] Wallace Johnson,[6] and other authors.[7] Occasionally, by the time that turning seems required, or before the operator is called upon to pursue this measure, the placenta has been already separated by the uterine contractions, and is so far protruding or pushed down into the vagina, as to fill up that canal, and prevent the easy introduction of the hand, or the ready extraction of the infant. Under such a complication, the authorities I have named unite in stating, that we must, as a matter of necessity, first remove the detached and obstructing placenta, in order to have the maternal passages sufficiently clear for the operation of turning.

The cases and circumstances under which this point of management has been advised are totally and essentially different, and founded upon a different principle from those in which I venture to recommend the extraction of the placenta before the child. A quotation or two from one or more of the authors to whom I have referred will point this out. I shall select for this purpose the observations of Mauriceau and Roederer, as being at once the simplest and the most explicit on the matter.

trouve quelque difficulté, et que l'on apperçoive que ladite teste ne se puisse tost avancer, ou que la mere ou l'enfant, ou tous deux ensemble soient debiles ; prevoyant que l'accouchement soit long, sans faute le plus expedient sera de chercher les pieds de l'enfant, comme nous avons dit, et le tirer doucement par iceux. *L'autre* point a observer, est si ledit arrière-fais est *fort sorty*, et qu'il ne se puisse remettre, tant pour sa grosseur qui pour le flux de sang qui l'accompagne ordinairement ; joinct aussi que l'enfant le suite de presse, et ne demande qu'à sortir et venir au monde, il faudra, tirer du tout ledit arrière-fais ; lequel estant tiré et sorti sera mis à costé sans couper le boyau qui est adherant à iceluy ; Car par la guide dudit boyau l'enfant se trouvera lequel s'il est viuant ou mort sera tiré par les pieds le plus dextrement que faire se pourra." In the *Provincial Medical and Surgical Journal*, for April 2, 1845, Mr. Blenkinsop has inadvertently published a literal translation of the above passage into old English, as a piece of original writing, by Dr. Percival Willoughby.

[1] *Diseases of Women with Child ;* Chamberlen's Translat., p. 220.

[2] *Art of Midwifery*, p. 154. [3] *Elemens de l'Art des Accouchemens*, p. 368.

[4] *Treatise on Midwifery*, p. 76. [5] *Ibid.* p. 113. [6] *System of Midwifery*, p. 33.

[7] Smellie (*Cases, etc., in Midwifery*, vol. ii. p. 307) states a case in which he followed this practice, the head being "hindered from advancing by the placenta." At p. 315, he observes, "I have had cases where the placenta has come down into the vagina before the child's head, and was *obliged* to deliver it first." It is remarkable that later authors should not generally mention a rule so obvious as that spoken of in the text. Yet among the writers of the present century, Petit is the only one, so far as I at present recollect, who even adverts to it. See his *Traité des Maladies des Femmes*, tom. ii. p. 23, 1806.

"If," observes Mauriceau—and I give as nearly as possible a literal translation of his words—"the placenta only presents at the os uteri without passing out, and the membranes are still entire, as sometimes happens, the accoucheur will push aside a little the part of the placenta that presents, till he reach the membranes, which he will immediately rupture with his fingers, to allow the waters to escape, and at the same time to turn the child, if it presents by any other part than the feet; by which he ought immediately to draw it out. For it must be observed, that the after-birth, which presents first, is now nothing more than a foreign body in the womb, when it is entirely separated from it, as it is now; and that in this case one ought, as it would seem, to draw it out before the infant. Nevertheless, as it is strongly attached to the membranes surrounding it, one would not easily accomplish this; for we could not pull away the body of the placenta, without at the same time pulling away the membranes that surround the body of the child; besides, the membranes that line the whole of the interior of the womb, from their smooth and polished surface, allow the child to be more easily turned, and prevent by their interposition the womb from being easily injured during the operation; which would not succeed so well if the placenta were just pulled away. For these reasons it is much more sure to draw away the infant first; which is, moreover, on these occasions, so feeble, that it would soon die, unless promptly assisted. *But if the surgeon find that the after-birth is almost completely escaped from the womb*, and that its membranes have been almost entirely broken up and torn, *in this case he ought to draw it out;* for, besides that it would now be useless to push it back into the womb, it would very much incommode the surgeon in his operation, and make him lose time in assisting the child."[1]

Roederer, according to the just and candid remark of Dr. Edward Rigby, "stands pre-eminent as being the first author who gives a

[1] *Maladies des Femmes Grosses*, etc., tom. i. p. 332. Speaking of Mauriceau's opinions and practice in placental presentation, Dr. Lee observes, "The rules for the treatment of these cases are laid down with the greatest precision. When the placenta was entirely separated, then only did he consider it as a foreign body, and recommend its extraction before the child; but to this practice, he states, as an obvious objection, that the placenta is strongly attached to the membranes which surround it, and that it cannot be drawn out without the membranes enveloping the body of the child being drawn out also. Mauriceau has related seventeen cases of uterine hemorrhage in the later months of pregnancy from presentation of the placenta, and in sixteen of these, delivery was accomplished artificially by passing the hand through the opening formed by the separation of the placenta from the uterus, rupturing the membranes, and turning the child. Two women

distinct and complete description of this [the unavoidable] species of hemorrhage."[1] After stating the propriety of passing the hand between the cervix and placenta, and promptly extracting the child by turning, when the hemorrhage is great, he adds, in relation to the point I refer to, "If the placenta is entirely detached, and is arrested in the vagina, and opposes the passage of the hand, it ought to be brought out with the clots that fill the vagina. But if the hand can be introduced, the placenta should be left, that it may shut up the passage by which the blood and liquor amnii which distend the womb might escape. In all cases when it is adherent to the womb, in whole or in part, it is most advantageous both to mother and child to leave it."[2]

The preceding extracts show that, as I have stated, the cases and circumstances under which the removal of the placenta before the child has been recommended by some of the older authorities, are entirely different from those in which I wish in these pages to insist upon its propriety. I advise its separation in cases in which it is still attached to the cervix, and often still contained within the undilated os uteri; they advised its removal only in cases in which it was already separated from the cervix, and expelled through the dilated os uteri. They began their practice of removing the placenta at the very point at which I would generally end all interference with it—viz. *after* the placental mass was completely detached. I would employ its artificial detachment as a measure of election and choice; they resorted to its removal from the passages, after it was detached by nature, merely as a measure of self-evident necessity and compulsion. I recommend its separation upon the *pathological* principle of arresting the existing hemorrhage, and so far cancelling the immediate source of danger to the mother; they recommended its abstraction on the *physical* principle of clearing the obstructed maternal passages, and gaining more free space for the operation of turning. They removed the placenta in order to be able to have recourse immediately to turning. I would remove it, in order to prevent the necessity of having recourse at all to that operation.

After having become interested in the investigation of the pre-

died after this operation, and one who would not consent to have it performed, died undelivered."—An Historical Account of Uterine Hemorrhage in the latter months of Pregnancy, by Dr. Robert Lee—*Edinburgh Medical and Surgical Journal*, 1839, p. 332.

[1] *System of Midwifery*, p. 252.

[2] *Elémens de l'Art des Accouchemens*, p. 368; Paris, 1765.

sent subject, I made a somewhat extensive research among obstetric works and essays, with the double object of ascertaining the average mortality to the mother in placental presentations under the common modes of management, and with the view of attempting to ascertain if any author had previously practised, or proposed as a plan of treatment, the method which had suggested itself to my mind, of artificially separating, and, if necessary, of removing the placenta instead of the infant, and operating thus *not* upon the child, but upon the after-birth. The results of the first part of the inquiry I have given in a preceding page. In reference to the second point, I was long under the belief, that I was original in the idea of a practice, which, so far as I was myself concerned, was, in the first instance, the result of simple reasoning upon the data afforded by two cases that I had personally observed, and by the histories of a few others that I had read of, or collected.

At the time I laid a summary of the present paper before the Edinburgh Medico-Chirurgical Society in December last, I had not met with any cases or remarks which altered my opinions in this respect. I stated at the time that I was the more surprised at such a result, for, believing as many of the older authorities did, that before the placenta could be found presenting at the os, it had already become detached, and fallen down from the higher parts of the uterus, I fully expected to meet with some of them recommending its removal at an early stage of the labour, if not upon the principle of arresting the attendant hemorrhage, at least for the purpose of clearing away a supposed foreign and obstructing body. They appear to have been generally intimidated from following such a line of practice by the dread of injuring the unruptured membranes, and through them the inner surface of the uterus, as intimated in the quotation which I have already made on this point from Mauriceau. And hence also the removal of the placenta, when it was once found completely, or almost completely, protruded from the uterus, and obstructing the vagina so as to impede turning, was justified, on the similar ground that before this could happen the membranes were necessarily torn, and consequently no evil effects would now ensue from this mode of interference.

Since these observations were communicated to the Medico-Chirurgical Society, I have fallen in with two cases recorded by one author, and a suggestion incidentally offered by another, both of which bear, as it appears to me, so importantly upon the history

of the practice which forms the immediate subject of these remarks, that I shall make no apology for dwelling briefly upon them.

During my former researches among the older authors, I did not examine in detail, as I certainly ought to have done, the cases of placenta prævia detailed in the work of the celebrated Paul Portal. In drawing up the table of maternal mortality in placental presentation (see page 179), I had predetermined to take the returns of which it consists from such authors or sources only as mentioned upwards of at least ten cases, in order that I might arrive at more certainty and statistical truth in the calculation. I took it for granted that Portal's cases did not come within this range, in consequence of Drs. Rigby,[1] Lee,[2] and others, erroneously speaking of them as being only eight in number. On the other hand, I knew well that this accurate and original observer was acquainted with the fact, that in placental presentations the placenta was originally fixed over the os uteri, and had not fallen down there after its attachment to the fundus. Hence, I did not expect to meet among his cases with any instances in which the placenta had been artificially extracted before the child as a foreign body, or any deviation made from the treatment usually followed. In two cases, however, which he has described, he most distinctly adopted the practice of detaching the whole placenta immediately before extracting the child. As these cases appear to me to be in various respects, not only historically, but practically, interesting, I shall take the liberty of quoting them at full length. They afford strong additional instances of the success of the practice which it is my wish to inculcate.

Case XXX.—"*The Delivery of a Child with the after-burthen foremost.*—April the 7th, 1672.—I was called to a woman in St. Mederic's Street, being in the sixth month of her reckoning, and troubled with a violent flux of blood. I told her immediately, that without being delivered forthwith, she was in danger

[1] "In Portal's cases in Midwifery there are eight in which he was under the necessity of delivering by art, in consequence of dangerous hemorrhage, and in all of them he found the placenta at the mouth of the womb."—Rigby's *Essay on Uterine Hemorrhage*, 6th edition, p. 22.

[2] "Portal's *Treatise*, 1685, contains an account of eight cases of uterine hemorrhage, in which he found the placenta not merely at the mouth of the womb, but adhering to the whole neck of the uterus. In several of these cases, he felt the placenta adhering all round to the internal orifice of the uterus. In those cases the treatment employed by Portal did not differ from that which had been employed by Parè, Guillemeau, and Mauriceau, the propriety of artificial delivery by turning being then as completely established as at the present time." Lee's *Clinical Midwifery*, p. 140.

of her life. Dr. Cresse, a Paris physician, was of the same opinion, and ordered her immediately to be let blood; however, we staid a little to see whether nature would help itself, it happening sometimes that such fluxes cease when the child comes to the birth well turned. But the woman, growing weaker and weaker, her husband and friends asked my opinion once more, and I answering, that the delivery of her was the only way to secure her life, they desired me to delay no longer.

"Whereupon I brought two of my fingers, well greased with butter, into the inner orifice of the womb, and, finding the same opened to the bigness of a French half-crown piece, I spread my fingers in the nature of a screw, and thus extending it, brought in my hand, and felt the after-burthen foremost. I separated the same to open my way to the membranes, which being opened, the water came forth, and I drew out the after-burthen, that it might not be in the way afterwards.[1] Then, searching after the child's feet, I took hold and pulled out one, which I baptized; and, wrapping a cloth round the foot, I accomplished the delivery of a daughter of six months, after my usual method. Immediately after the woman recovered of her swooning fits, she began to breathe and speak, telling us that she felt herself something stronger, but relapsed soon after; yet being recovered again, by the care of Dr. Cresse, she did very well afterwards. We applied a plaister against the flux, made of the flower of gips used by the plaisterer, mixed with the best vinegar, laying it to the belly above the womb, and above the hips. The next day we prescribed a clyster of barley and white bread, boiled together, and mixed with three ounces of honey of violets; but the nurse, mistaking the matter, took honey of roses instead thereof; whence, it is obvious how careful women ought to be in choosing their nurses, since, by the management of clysters only, many dangerous symptoms have ensued through the carelessness or ignorance of the nurses. Wherefore women ought to pitch upon such nurses as are used to attend in lyings-in, and such as they know, that will not be employed in the small-pox and other infectious distempers, which thus may be communicated to the woman in childbed. All nurses ought to be cautious not to give medicines to women in childbed, without the advice of a physician, surgeon, or expert midwife; and especially not to apply astringent remedies in the beginning of the flooding, which, if it succeeds ill, they are sure to lay the blame on the man-midwife, or midwife. 'Tis but lately that I knew such an ignorant and presumptuous nurse, who, in the beginning of the flooding, washed the gentlewoman under her care with red wine only, which, stopping the flooding, etc., fever ensuing, the patient was forced to be let blood several times in the arm and foot, and yet they had much ado to save her."[2]

Case XXXI.—"*The Delivery of a Woman affected with a most violent flux of blood.*—January 14, 1679.—I was called out in the morning at four o'clock, to deliver a gentlewoman in the street called Gervais Laurent, at the foot of the Bridge of our Lady, in the parish of the Holy Cross. This gentlewoman being about eight months with child, was seized with a most violent flux of blood,

[1] I shall quote the original French of this important passage :—Je glissay ma main dans l'entrée de la matrice, où je sentis l'arrière-faix qui se presentoit. L'ayant separé afin de me frayer le chemin, je sentis les membranes des eaux que je perçay, et les eaux s'estant écoulées, je tiray l'arrière-faix le prémier, afin qu'il ne m'incommodast point à la sortie de l'enfant."—*La Pratique des Accouchemens*, par Paul Portal ; Paris, 1685, p. 203.

[2] *Complcat Practice of Men and Women Midwives*, by Paul Portal, p. 148. Case 43. London, 1763.

which having continued for ten or twelve days, she was reduced to a miserable condition. Upon search made with my fingers (well greased), I found the whole vagina or passage filled with clods of coagulated blood, notwithstanding which the flux continued. As soon as I had brought out the clods of blood, I conveyed my fingers further into the orifice of the womb, which I found very thin and soft, and so wide, that I could put in three of my fingers foremost. I searched with one finger first, and found the after-burthen foremost, and closely joined round the inner orifice of the womb, which was the occasion of the excessive flux of blood ; and, as it had reduced the woman to a very low condition, so this, joined to the other circumstances, made me fear the life both of the woman and child. I desiring, therefore, the assistance of a physician, Dr. Biendisant was sent for, who, finding the poor patient not in a condition to dispense with many remedies, prescribed her only a mixture of purslane and plantain water, three ounces each, half a drachm of the confection of hyacinths, without musk ; prepared pearls, one scruple, mixed with an ounce and a-half of the syrup of pomegranates. This stopped the flux for a while, yet not quite ; so that, her weakness increasing every minute, it was resolved to have her delivered, notwithstanding the great danger which must needs attend it ; but considering her death was infallible, unless she was delivered, I went to work ; though, as I laid her across the bed, there appeared in her not the least signs of sense or motion, so that everybody concluded she would die under my hands. However, I found some means to convey my hands (well greased before) into the inner orifice of the womb, where I again felt the after-burthen fastened to it, as I had told Dr. Biendisant before. I peeled it off by degrees, and brought it out ; and then, turning my hand again in the womb, the first thing I met with was the navel-string, along which I guided my hand first to the child's belly, and then downwards to the thigh, and hence lower to the leg and foot, which I brought out and baptized.[1] Whilst I was pulling this foot, the other followed, and the whole body after it, as it has been observed frequently before. The child being quite alive, the parish priest of the Holy Cross (who had before administered the sacrament unto the mother) had the opportunity of baptizing it, though contrary to his and all our expectations. Immediately after the delivery, the woman recovering in some measure her senses, Dr. Biendisant prescribed the following cordial : of succory and bugloss water, three ounces each ; of the confection of alkermes without musk, half a drachm ; of prepared pearls, one scruple ; and syrup of maidenhair, two ounces. About two hours after, she was ordered to take half a cupful of broth only, for fear of overcharging her stomach. She was much better the next day, yet not without some symptoms of a fever, against which a clyster was ordered, made of the decoction of the cooling herbs, with three ounces of honey. The second day after the flooding stopped, she recovered again by the use of the before-mentioned cordial. However, she complained of a tension and pain in her belly (which was much swelled), as also in her hips, wherewith she had been affected before her delivery : she was also afflicted with a violent pain in the head (the ordinary symptom of all excessive fluxes of blood), which continued even after her lying-in, with an intermittent fever : she was also troubled with frequent bilious dejections, or a looseness,

[1] "Je separay tout doucement cet arriere-faix, et je tiray dehors ; ensuit je glissay ma main dans la matrice. La premiere partie qui se presenta, fut l'ombilic que je suivis jusques au ventre, apres lequel je suivis la cuisse jusques a la jambe et au pied, que je tiray à l'orifice externe de la matrice sur lequel je jettay de l'eau, pour ondoyer l'enfant sous condition."—See original French edition of Portal's work, p. 293.

against which we prescribed her clysters of the decoction of emollient herbs, with lintseed; yet, after some time this woman recovered her health, except that three weeks after her lying-in she lost the sight of one of her eyes by a violent defluxion, which by all the art that could be devised, was never removed thence. The cause of this disaster[1] I attribute to a sharp, viscid, and bilious humour, contained in the veins, which being put in motion by the violence of the pain this woman suffered during her labour, and the anxiety she lay under, was carried upwards and settled in her head." [2]

In addition to the two preceding cases, Portal gives a detailed account of six other placental presentations which came under his care, and mentions six others that he had seen, but of which he does not give the full particulars.[3] In one of these cases the uterus contracted so strongly, as to push the child through the placenta. The mother recovered. In all his other cases he seems to have introduced his hand, and turned the infant; but in none of them, with the exception of the two we have already quoted, does he state such particulars as to show whether, as in them, he entirely separated the placenta immediately before turning the child, or only partially separated it in that position, so as to enable his hand to pass into the uterine cavity, for the purpose of practising version of the infant. Unfortunately, he in no passage states to us, in the way of remark, or otherwise, what special practice, or principle of practice, he recommended or followed in placental presentations, and in only one part does he throw out any hint of the reason which induced him to separate the placenta in the two cases I have cited. The hint in question I have already had occasion to quote, as given incidentally in the details of the first case which I have already cited (see Case XXX.) "I drew out," he observes, "the after-birth first, that it might not incommode me during the passage of the infant (*Je*

[1] This is perhaps the earliest case on record of that *Phlebitic* or *Puerperal Ophthalmitis* to which the attention of the profession has been particularly called in our own day by Drs. Hall and Higgenbotham, Dr. Locock, Dr. M'Kenzie, and others. In attributing it to a "humour contained in the veins," Portal almost forestalls the pathology of the disease accredited at the present day. An instance of this destructive ophthalmia occurred two years ago, in the practice of my friend Dr. Graham Weir, after, as in Portal's case, a placental presentation. The patient also ultimately recovered. I know of a case in which both eyes were affected. Some years ago, in a case of placental presentation, in which I turned the child, I saw come on in a different part—namely, the region of the parotid gland—a secondary inflammatory deposit from "a sharp humour contained in the veins, and carried upwards and settled in the head." I have met with one other case of fatal *Puerperal Parotitis*. (For further observations on this subject, see Section on Pathology of Puerperal State.)

[2] *Compleat Practice of Men and Women Midwives*, p. 214, Case 69.

[3] *Ibid.* pp. 29-105, 107, 135, 143, 166, 169, 250.

tiray l'arrière-faix le premier, afin qu'il ne m'incommodast point à la sortie de l'enfant[1])." And in all probability this was his sole and only reason for the practice. For if he had separated the placenta with any idea whatever of the principle under which I have recommended it, namely, that of totally arresting the violence of the attendant hemorrhage, and averting the principal or only danger to which the patient is subject in placental presentations, he certainly would not have practised what he tells us he did—the instantaneous extraction of the infant afterwards.

I have already (at page 186) mentioned some particulars of a very interesting case of expulsion of the placenta before the child, detailed by Mr. Chapman, surgeon at Ampthill, Bedfordshire, and reported by him in the 4th volume of Dr. Duncan's *Annals of Medicine*, published in the year 1800. My attention has been particularly drawn to three brief remarks that Mr. Chapman appends to his case. One of these remarks is specially deserving of note, from containing, so far as I am aware, the first explicit suggestion as to the proper principle of treatment in some placental presentations. I shall quote it in the author's own words.—"From the expulsion of the placenta to the birth of the child was full four hours. She (the mother) lost little or no blood. How far does this suggest a different practice to that in general followed?—I mean that of delivering the placenta previous to delivering the child, in those cases of alarming hemorrhage where the placenta is situated on the side of, or over, the os uteri."[2]

Up to the time at which I communicated the views contained in the present memoir to the Medico-Chirurgical Society in December last, the two cases that I have quoted from Portal, and the preceding interrogatory of Mr. Chapman, contain, so far as I have been able to learn, all that had been put upon record with reference to extraction of the placenta before the child, in placenta prævia. Since, however, the first part of the present paper was printed in the *Monthly Journal of Medical Science*, I have obtained such information as to convince me, that several years ago, a medical teacher and practitioner of the highest distinction in Manchester was aware that the total separation of the placenta in unavoidable hemorrhage was capable of arresting the attendant flooding, and adopted this practice as a measure of treatment in one of the classes of cases that

[1] *Pratique des Accouchemens*, p. 209. [2] *Annals of Medicine*, vol. iv. p. 308.

I shall have occasion to consider under the next section—namely, where the woman is too exhausted to allow with safety of the operation of turning. The gentleman I allude to was the late Mr. Kinder Wood, who for some years was lecturer on Midwifery in the Manchester Medical School. He died in 1830. His opinions on this matter were never, so far as I have been able to ascertain, known or divulged beyond the range of his own immediate friends and pupils; and one of his own colleagues in the Manchester Lying-in Hospital, Mr. Wood, confesses he was unacquainted with his views till they were mentioned to him within the last few months.

In a short and interesting biographical account of Mr. Kinder Wood, published in the *London Medical Gazette* for 1830, it is stated that he left behind him a volume of midwifery essays all but ready for the press.[1] One of the papers was entitled "An Essay on Uterine Hemorrhage, and the best mode of Treatment in alarming cases of this kind." It is deeply to be regretted that this volume has never been given to the public, as the opinions of so acute and able an observer as Mr. Kinder Wood on any points connected with the obstetric profession, are almost certain to be sufficiently valuable to have entitled them to a better fate. Dr. Radford, who succeeded Mr. Kinder Wood as lecturer on midwifery in the Manchester School, purchased, as I am informed, the manuscript volume I allude to, after the author's death, and has lately published the following observations and cases of Mr. Kinder Wood, relative to unavoidable hemorrhage, probably from the manuscript in question. I have very great and sincere pleasure in inserting them here, at length, as a piece of posthumous justice to the memory of a man of distinguished professional attainments.[2]

[1] The biographer, Dr. Bardsley, states—"Mr. Wood had been employed for some time in collecting materials for a separate volume on midwifery, embracing the consideration of some of the most important points connected with the practice of the art. The essays on 'Uterine Hemorrhage, and the best mode of treatment in alarming cases of this kind;' on 'Rupture of the Uterus during Labour;' on 'Inversion of the Uterus;' and on 'Impracticable Labour from Distortion,' are left in such a state of readiness for the press, as to require only a few verbal, and other trivial alterations, before being submitted to the public eye, should this be the intention of Mr. Wood's family."—*London Medical Gazette*, vol. vii. p. 624.

[2] Since I communicated the present memoir to the Medico-Chirurgical Society, Dr. Radford has himself given and published a lecture on galvanism, in which, among other ingenious suggestions, he proposes the detachment of the placenta to be adopted in conjunction with galvanism, in cases of placenta prævia.—*Provincial Medical and Surgical Journal* for December 24, 1844. In this lecture he limited the practice in question to cases of "exhaustion"—as Mr. Kinder Wood had done. Latterly, however, in the same journal (see Number for January 22,

"If we find so much exhaustion as to make us fear the effect of further hemorrhage during artificial delivery, the first step, after passing the hand, must be to detach the whole of the placenta; by this, hemorrhage will be completely suppressed, for the effect of passing the hand through the os uteri, and throwing off the placenta, will always be to produce so much contraction as to arrest the bleeding from the small decidual or uterine mouths. It is satisfactory to know that the child is rarely living in these cases of exhaustion, its blood being poured out through branches of the placental structure, along with that of the mother; and when brought down, its appearance, like that of the mother, is bleached and exsanguined. The time required to separate the placenta is very short, and the loss of blood during the attempt exceedingly trifling. I know, from experience, that when the placenta is wholly detached, the hemorrhage will cease."

Case XXXII.—"I was desired to see Mrs. Clayton, Lad Lane. The hemorrhage had been going on several days, under the inspection of a female midwife, without any assistance or advice. The discharge had been excessively profuse, and was coming away in gushes, with slight pain, every two or three minutes. She was extremely exhausted; of a deadly paleness, very cold, with a quick and feeble pulse; the os uteri was moderately dilated, the cervix obliterated, and the placenta presenting. I feared the effect of hemorrhage, which must occur during the act of delivery in the common manner. The patient was placed in a proper position, and a little brandy and water exhibited, and the placenta completely detached, as the hand dilated the os uteri, and before reaching the feet of the child. No hemorrhage succeeded the separation. The patient recovered favourably, but slowly. October 4, 1821."

Case XXXIII.—"I was desired to see a poor woman in Newberry Street. I found from the female midwife in attendance, that the discharge had been going

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1845), he has adopted more fully, and published, my previous ideas of applying the detachment of the placenta to other cases of placenta prævia, besides those in which there is simple exhaustion—erring, however, in this, that he conceives the practice is one which cannot be attempted until the cervix and os uteri will safely allow the introduction of the hand. Under the next section we shall find that this would exclude an important range of cases to which the practice is especially applicable. I had an opportunity of stating my views on the artificial detachment of the placenta to Dr. Radford when he made a visit to Edinburgh last year. Dr. Campbell, the well-known lecturer on midwifery in Edinburgh, and a friend of Dr. Radford, heard the subject discussed between us. When writing lately upon this matter, Dr. Campbell observes, "It does strike us as remarkable, that Dr. Radford, while on a visit to this city something less than a year ago, did not, when this subject was the topic of conversation, make known his knowledge of Mr. Kinder Wood's views.—*The Northern Journal of Medicine* for July 1845, p. 90. See further the *Provincial Medical Journal* for Feb. 5th, Feb. 26th, and March 19th, 1845. See also *London and Edinburgh Monthly Journal of Medical Science*, Feb. 1845, p. 161.

on long and copiously. The poor patient was extremely exhausted. Feeling that she could not survive long if left to nature, and that she could not bear the hemorrhage consequent upon the common operation, I separated the placenta, brought down the feet of the child, and delivered. The effusion produced by separating the placenta was extremely slight, and it ceased upon effecting the complete detachment. The child was dead, and tending to putrefaction. A stimulant was given before the operation, and during its continuance, but the heart never recovered its energy nor the skin its warmth. She died in about an hour, from pure exhaustion. November 1, 1821."

Case XXXIV.—"I attended Mrs. T., Newton Heath. She was very much exhausted. It was obvious she could not bear the loss of blood consequent upon the ordinary delivery. A cordial was now administered. The hand was introduced, and the placenta, which was adherent over the os uteri, was completely separated, the membranes ruptured, and the feet seized. The child was easily delivered. She only survived the operation a very short time, although the hemorrhage ceased from the moment the placenta was detached."

Case XXXV.—"I was called to Mrs. B., January 1822, aged 25, St. James's, who was violently flooding. I found her cold, and her pulse scarcely perceptible; os uteri partially dilated and soft; brandy and water given; the discharge still continued; she was much exhausted. The hand was introduced, the placenta detached, and the membranes ruptured. There was no further discharge; but she died in a few hours afterwards, although stimulants were freely administered."

Case XXXVI.—"On the morning of the 11th April 1822, I was desired by a female midwife to see Mrs. Rawson in Little Lever Street. She was in the latter end of the eighth month of pregnancy. She had sustained frequent and copious discharges the two previous months, and which were very profuse during the night. The pains were slight, but always attended with fresh discharge. The patient presented a very distressing appearance. The pulse could not be counted; the lips were white; she was very cold, and spoke in a whisper; she had frequent syncope. Warm brandy was freely administered. The patient was placed with the utmost care slowly and gently on the side, and upon making an examination, the os uteri was found low, soft, and dilated about the size of half-a-crown, the cervix was obliterated, the placenta was found over the os uteri, one portion was loosened. Convinced that the patient could not bear immediate delivery, and satisfied that the hemorrhage would be fatal very early if she was left to nature, I insinuated the hand through the os externum and os uteri, detaching the placenta by sweeping the fingers beneath it, as the hand was passed forwards. The soft parts yielded freely, and the operation was done quickly and easily, and with very trifling loss of blood. The presence of the hand excited uterine contraction, and seemed to rouse the languid patient. A stimulant was given during the operation. The head was found presenting. After the placenta was separated, the membranes were ruptured, and the hand slowly withdrawn. She was ordered to remain in a state of perfect and complete rest, to take light support, and a stimulant mixture every three hours. The labour pains became stronger about six hours afterwards, and in an hour expelled the placenta, and a dead child, tending to putrefaction. No hemorrhage occurred when the hand was withdrawn, after detaching the placenta. The patient regained health slowly, and had a severe attack of phlegmasia dolens.

"In some cases I have been called to attend when the ordinary method of delivery has been adopted, the patients died, and this led me to modify the practice, which I adopted in some of the above cases by detaching the placenta,

rupturing the membranes, and then delivering the child ; but after due consideration, I was again induced to vary my plan ; and in those cases where we can have no hope of saving the patient if we proceed to delivery, however well the operation be conducted, I have no hesitation in recommending that the placenta be separated completely, and the membranes ruptured, that the hand be withdrawn immediately upon this being effected, leaving the child and placenta behind. By this practice, the patient will be placed precisely in the situation which occurs in the most favourable cases of recovery [delivery] by the natural efforts. I conceive no fact in midwifery rests upon a more solid foundation, than that this hemorrhage will cease upon separating the placenta, and by this practice the patient is placed in as favourable a situation as is possible for recovery. Time will be gained to support her by proper means, and which can be used with greater freedom, as the hemorrhage is infallibly suppressed by this operation."

On communicating, a few months ago, my ideas upon the subject of this memoir to my esteemed friend Dr. Beatty of Dublin, he favoured me with the following account of a very interesting and illustrative case from the note-book of his late father. It is dated July 28, 1835 (1825 ?).

Case XXXVII.—*Placenta probably entirely separated for about twenty-four hours before delivery; hemorrhage arrested by it.*—"The practice I adopted in this case was such as I never tried before, nor heard of, and from its success I think it necessary to note it. This lady sent for me at four o'clock on the morning of the 27th. I found that she had been flooding excessively, and, as the nurse said, she was in a sea of blood. She was within three weeks of her full time. I examined and found the placenta directly over the os uteri. I sent for Dr. Duke, and on his coming, I introduced my hand into the vagina, and, finding I could not turn without more difficulty than I thought necessary, it occurred to me to separate as much of the placenta as was within my reach. This I did to such an extent as entirely stopped the hemorrhage, except a trifling oozing. She continued all day without pain, and about three o'clock the following morning, labour set in, and she was delivered of a still-born child at half-past four o'clock A.M. She had no further flooding, and is likely to do well."

Since the publication of the first part of the present essay, three instances have been published in the Medical Journals, in which the proposed practice was adopted—one by Mr. Wilkinson of Spalding, another by Dr. Walker of Chesterfield, and a third by Dr. Maclean of Edinburgh. I shall append an abridged detail of these cases.

Case XXXVIII.—*Flooding suppressed by the artificial separation of the placenta; patient delivered in an hour and a half afterwards.*—Mr. Wilkinson was called, on the 7th June 1843, at twelve P.M., to a woman between six and seven months advanced in pregnancy. "Three weeks previous to my being sent for," says he, "there had been, I was informed, very great hemorrhage, which had continued, more or less, up to the time of my seeing her. On the evening of the 7th, it had been very considerable, and previous to my seeing her, excessive. I found the os uteri dilated to the size of something less than a five-shilling piece ; the placenta presenting ; the hemorrhage excessive ; the pains very feeble.

She was greatly exhausted; the pulse scarcely perceptible; the countenance blanched, and I found that she must sink. I directed some brandy and water to be got down immediately, and also a scruple of ergot of rye. I passed first three fingers, and, with as little delay as possible, the whole hand, into the uterus. The gush of blood was at first great; the placenta, however, was quickly and completely detached, and the hemorrhage *almost at once* ceased. I waited a while with my hand in the uterus; I then brought away the placenta, and immediately re-introduced my hand, with a view of bringing on contraction. The head of the child presented; I turned; but feeling that my patient was not in a state to bear immediate delivery, I waited an hour and a half. She then having somewhat rallied, I delivered. She remained during the first two or three days in a most exhausted state, from which, however, she gradually recovered. I feel satisfied," Mr. Wilkinson adds, "that had the usual plan been adopted in this case, so great had been the hemorrhage previously to my seeing her, that she must have sunk."[1]

Case XXXIX.—*Exhausting flooding; placenta extracted, and flooding suppressed; arm presentation; turning.*—Dr. Walker was called to see Mrs. H——w, about four hours after labour with her sixth child had begun. She appeared in a most alarming state of exhaustion, exhibiting in an extreme degree all the symptoms consequent upon great loss of blood. "On making an examination," writes Dr. Walker, "I found the vagina filled with clotted blood, the os uteri fully dilated, and a large portion of the placenta presenting, nearly closing the orifice of the uterus. With some difficulty, I passed my finger round the anterior edge of the placenta, to ascertain the presenting part of the child, and felt what I thought was either a shoulder or the nates. The attempt increased the hemorrhage slightly; and, fearful of further reducing the already too exhausted powers of my patient, I desisted. Having previously determined to adopt the plan of treatment lately brought before the profession by Drs. Radford and Simpson, I proceeded to remove the placenta. Introducing my left hand, I completely, and in one mass, separated the placenta, which was immediately expelled with my hand into the vagina; after its complete removal, the hemorrhage, which before was considerable, *entirely* ceased. At this time, the pains were feeble, and not of frequent occurrence. At my next examination, I found that a hand had followed the placenta, and now presented at the os externum. With the usual precautions, version was easily accomplished, and the woman safely delivered of a still-born child. The uterus contracted with tolerable firmness, and no farther hemorrhage supervened. On the day following, I found my patient comfortable, though suffering slightly from the effects of the hemorrhage, and in a few days she was perfectly recovered."[2]

Case XL.—*The placenta extracted artificially before the child; rapid recovery of the mother.*—This case I have already alluded to as having happened in the practice of Dr. Maclean. The subject of it, Mrs. Nixon, was taken in labour with her eighth child on the 14th of June 1845, at 4 P.M. The pains were trifling till about three next morning, when they became more frequent and severe, and were accompanied with a discharge of blood. The os uteri was found at this time expanded to the size of a shilling, but rigid and undilatable, with the placenta presenting over it, and a constant oozing of blood, which at each pain became much increased. The pains and discharge nearly ceased after the administration of a slight opiate, and using the ordinary means to check the hemorrhage. At 11

[1] *Provincial Medical and Surgical Journal* for July 1845, p. 471. [2] *Ibid.* p. 557.

o'clock the pains and flooding returned ; and an hour and a half after this, "I found," says Dr. Maclean, "the os dilated to the size of a half-crown, the placenta presenting, and protruding through it about one and a half inches. The hemorrhage, which had recurred with the pains, had caused such a degree of faintness and collapse, that the fatal termination of the case appeared inevitable ; and the pains which now came on frequently, from the great weakness of the patient, had but little effect in dilating the os uteri, and advancing the labour. Having ascertained," he continues, "by the stethoscope, that the child was dead, and Mr. Woodhead being again in attendance with me, it was at once agreed upon, in consultation, the mother alone requiring our immediate attention, and the state of collapse to which she was reduced rendering the forced delivery by turning exceedingly dangerous, while the evacuation of the liquor amnii had entirely failed even to moderate the hemorrhage, that I should immediately endeavour to suppress the discharge by separating the whole body of the placenta from the uterine parietes, when the patient might be allowed to rally a little before removing the child, supposing the views of Dr. Simpson to be correct. Accordingly, having administered a small quantity of spirits, with a few drops of laudanum, to the patient, I immediately introduced my hand into the womb, so as to remove the placenta. This I was easily enabled to do, after dilating the os uteri, by pressing down the placenta, with the fingers introduced behind it, into the palm of the hand. A few minutes were sufficient to effect this ; and I was much gratified to find all hemorrhage cease, as soon as *the whole placental mass was detached.* The placenta being carried down into the vagina, a dose of ergot was administered, and, in about a quarter of an hour, the natural pains expelled the child. There was no after hemorrhage, and only slight lochial discharge. The mother recovered without the slightest drawback, and was out of bed in a few days."

"The above case," observes Dr. Maclean, "from the alarming symptoms attending it, and the certain fatality which must have ensued, had the flooding continued for a short time longer, with the immediate suppression of all hemorrhage on the placenta being completely detached, thus allowing time for the patient to rally, would seem to prove the operation of turning in these cases to be almost needless ; at the same time that it affords another instance of the accuracy of the conclusions published by Professor Simpson in the *London and Edinburgh Journal* for March last, where he proposes in such cases to remove artificially the placenta, and not the child."[1]

After the present section was written, my attention was accidentally called to some interesting remarks, bearing directly upon the point of which it treats, and contained in the old and rare *Observations sur la Pratique des Accouchemens* of Viardel, printed at Paris in 1671. I append a literal translation of the passage in Viardel's work.

[1] *Northern Journal of Medicine* for August 1845, p. 132.

Case XLI.—"All these labours where the placenta presents or escapes entirely are very dangerous, as the infant often loses its life, as happened to the wife of Monsieur le Fèvre, merchant living in the Rue de Gèvre, in whom the after-birth presented first, and occupied all the internal orifice of the womb. Being called, therefore, to deliver her, and finding matters in this state, as I discovered from examination, I pushed back the after-birth with the extremity of my finger, in order to return it into the womb, and having passed my hand into it as far as I could, I passed it around the internal orifice in order to assure myself, and thus discovered that it was the after-birth which was entirely separated from the womb (*entirement separé de la matrice*), and that the infant presented behind it by the umbilicus. After observing all these things, and being assured that it was the placenta, I prepared to succour her as quickly as possible, in the following manner: —I placed her across the bed with the thighs separated and the heels drawn up to the hips, having first made her take a couple of eggs with a little wine, to strengthen her. I introduced my hand into the womb (as I have said above), and having arrived at the internal orifice, I grasped the placenta by its middle part with my open hand, and holding it firmly, drew it out of the womb, and, the moment it was out, I put back my hand to search for the feet of the child, and having found them I drew it out, dead. * * * As soon as I completed the delivery, the loss of blood, which had persisted till then, and all the other accidents, ceased; and I believe that the infallible prognosis in such a case is, that the child must be dead, although in truth the case is not always so, for it may happen in similar labours, that the infant being strong and vigorous, may escape shipwreck if it be promptly and timeously succoured; and I may add here, in confirmation of this, that I have met with a case of the same kind where the infant lived for three days, although very weak and feeble."[1]

III.[2]

Section IX.—Cases of Placenta Prævia in which it is proper, 1. To Evacuate the Liquor Amnii; 2. To Extract the Infant by Turning; and, 3. To separate and extract the Placenta before the Child.—Series of Cases to which this last Practice is applicable, viz. 1. When the Os Uteri is rigid and undilatable; 2. In First Labours; 3. In Premature Labours; 4. In Labours supervening earlier than the seventh Month; 5. When the Uterus is too contracted to allow of Turning; 6. When the Pelvis or Passages are organically contracted; 7. In Cases of Exhaustion; 8. When the Child is Dead; 9. When it is premature and not viable.

The various cases adduced in the last section will probably be admitted on all hands to demonstrate sufficiently the practicability

[1] *Pratique des Accouchemens*, p. 90.

[2] First published in *Obstetric Memoirs and Contributions*, 1855, vol. i. p. 774, though printed and privately circulated several years previously.

of the plan of treatment in placenta prævia which it is my object to bring before the Profession in the present Essay. In the next instance, it is requisite for us to consider in what special cases of placental presentation it will be proper to adopt the principle of treatment in question.

I have already stated (see page 183) that I believe it would be found the just and legitimate mode of practice in those cases of placental presentation in which either the artificial evacuation of the liquor amnii is unsuccessful, or forced delivery by turning is inapplicable and dangerous.

To understand, then, thoroughly the varieties of cases in which we should adopt the complete separation and extraction of the placenta before the child as a line of practice, it will facilitate our inquiries if, in the first instance, we consider the class of cases in which, *first*, The evacuation of the liquor amnii ought to be followed, and, *secondly*, Those in which the delivery of the child by turning constitutes the suitable mode of treatment. Having cleared the way by considering these two points, we shall be more able to judge of and appreciate the remaining varieties of placental complication in which this new means of treatment ought to be adopted.

1. Cases of placenta prævia, in which *the evacuation of the liquor amnii* forms the proper practice.

The artificial evacuation of the liquor amnii appears to be principally followed when the placental presentation is partial only, and consequently, when a segment of the bag of membranes, as well as a segment of the placenta itself, is placed over the os uteri. When this practice has the desired effect, it forms undoubtedly the simplest and safest of all the means of treatment. But its applicability is limited. The proportion of cases in which the placenta is observed to present partially, would seem not to be so great as of those in which it presents completely.[1] Besides, when it does present partially, the rupture of the membranes and the escape of the liquor amnii would appear to be by no means so certain a mode of arresting the hemorrhage in this form of unavoidable as it is in accidental flooding.

[1] Out of 50 cases of placenta prævia reported by Dr. Francis Ramsbotham, the placenta presented completely in 32, and partially in 18 instances. *Principles of Obstetric Medicine and Surgery*, Appendix, p. 721.

"The method of Puzos[1] cannot," Baudelocque avers, "have, in these cases of partial placental presentation, those advantages which have been generally found in it when the source of the hemorrhage is farther off (or of the accidental form). When the placenta is attached to the neck of the uterus, if the hemorrhage is suspended for a moment, when the waters are evacuated it soon appears again, and becomes so much the more abundant as the orifice of the uterus dilates further, and as the violence of the labour increases. I have met," he adds, "with but one case where the flooding has entirely ceased, after the evacuation of the waters, out of at least five-and-twenty where the placenta was attached to the neck of the uterus.[2]

The practice of evacuating the liquor amnii in partial placental presentations has generally, however, been found much more successful than it appears to have proved in the hands of Baudelocque. No obstetrician has probably, at the present day, had more opportunities of testing its value than Dr. Francis Ramsbotham of London. He informs us, in his *Principles and Practice of Obstetric Medicine and Surgery*, that he had attended, up to 1834, as many as forty-four cases of partial presentation of the placenta. In forty of these cases the membranes were ruptured some time before delivery. The results of the treatment of the artificial evacuation of the liquor amnii in thirty-nine of these cases were as follows:—

[1] Puzos wrote a very beautiful memoir upon the artificial evacuation of the liquor amnii, as a means of arresting and treating cases of accidental hemorrhage (Mémoire sur les Pertes, etc., et sur la Méthode de procéder a l'Accouchement dans les Cas de Nécessité, par une voye plus douce et plus sûre que celle qu'on a coutume d'employer.—*Traité des Accouchemens*, p. 323; or *Mém. de l'Acad. de Chirurgie*, 1743, tom. ii. p. 203.) Hence this practice is often spoken of, as in the text, under the name of the method of Puzos. The honour, however, of first proposing and adopting this particular line of treatment certainly belongs to Mauriceau, who described and practised it half-a-century before Puzos (see his *Maladies des Femmes*, etc., tom. ii. cases 307, 450, 459, 479, 480, etc.) He even preceded Puzos in his explanation of the principle upon which the treatment acts in suppressing the discharge. "The vessels of the uterus, which," says Mauriceau, "were open, become shut by the contraction of its proper substance, as soon as the waters of the infant, which held it extended, are evacuated from it," tom. i. p. 334.—Daventer (*Art of Midwifery Improved*, p. 153, English trans., London, 1716) and Dionis (*General Treatise of Midwifery*, p. 244 of English trans., London, 1719) both also recommended the practice previously to the time of Puzos. "But if there are floodings," says Dionis, "from the separation of some part of the after-birth, however little soever the womb is dilated, the membranes which contain the waters must be broke, that the distension may be taken off, and that the after-birth may not be farther loosened, which both prevents the increase of the flooding, and makes way for the child's advancing into the passage, and being born the sooner."

[2] *System of Midwifery*, Heath's Translation, vol. ii. p. 37.

In thirteen cases, *or in* 32 *per cent of the whole*, the labour was afterwards terminated by the natural powers alone.

In twenty-six cases, *or in* 65 *per cent of the whole*, in consequence of the hemorrhage not ceasing on the evacuation of the liquor amnii, turning was subsequently adopted. One was terminated by the forceps.

Eight of the forty-four patients died, four of them apparently from the excessive loss of blood suffered before delivery was effected.

The principal arguments that have been used by obstetric authors against the artificial evacuation of the liquor amnii in placental presentations, have been, first, Its alleged inefficiency in arresting the hemorrhage ; and, secondly, The difficulty which the loss of the liquor amnii entailed or produced in the operation of turning, if that operation afterwards required to be adopted in consequence of the continuance of the flooding. These objections, but particularly this last one, will probably be entirely removed, by having the other expedient in abeyance, to which our attention is directed in the present essay—namely, the complete detachment of the placenta itself. The previous evacuation of the liquor amnii, whether by puncturing the membranes or by puncturing the placenta, would not interfere with any plan that it might be afterwards considered proper to adopt for the entire detachment of the placental mass. The knowledge of this latter alternative will certainly entitle us to have recourse oftener than has hitherto been done to the milder expedient, in the first instance, of evacuating the liquor amnii. It can be practised, when necessary, at a time when the os uteri is still so small and contracted as not to admit easily of the adoption of other measures. Little or no difficulty is in general encountered in its performance. When, from the placental presentation being partial, the membranes alone require to be perforated, the nail of the fore-finger, or the end of a surgeon's probe, or of a wire or pen, will suffice for the purpose. But, when the placental presentation is more complete, the instrument that is employed requires to be passed through its substance, and more care is required lest the placental structure be too much lacerated, or the fœtus itself wounded. The hair needle, which we have already (p. 181) found spoken of in this case by Daventer, the small trocar recommended for it by Deleurye, and the perforating instruments of Roederer,[1]

[1] *Elementa Art. Obstetriciæ*, par. 627.

Fried,[1] Ritzen,[2] Kluge,[3] etc.,[4] consisting of hollow tubes or canulas, blunt or rounded at the extremity, and provided with a puncturing lancet worked by a spiral spring, would probably none of them be so safe as other means with which the surgeon is more likely to be provided. The common surgical exploring needle might be used with a blunt, instead of a sharp-pointed, wire passed through it. Gendrin used successfully, and he states, "with facility," a common catheter. Probably its blunted extremity would, more readily than we might at first conceive, pass through the membranes covering the placenta, in consequence of the resistance opposed on their fœtal side by the distension of the liquor amnii. A common quill, with a lateral aperture like that of a catheter cut near its extremity, and another at the opposite end of the barrel, to allow of a free escape to the waters, would perhaps answer the purpose perfectly, could always be easily procured, and its blunt point, like that of the catheter, would not endanger the infant. Perforating the placenta with the fore-finger, and rupturing the membranes with the nail, might in the same way be used with similar results, and even with greater certainty of effect; but from what we have said of the source of the discharge in unavoidable flooding, it would seem a leading object not to lacerate, to any great and unnecessary extent, the substance of the placenta itself, as its maternal vascular cells might thus be opened up to a more dangerous degree.[5]

If the operation, in whatever way performed, failed, by not proving successful in sufficiently arresting the hemorrhage, it might still at least gain for us some time for the greater dilatation of the os uteri, and hence for the more easy separation of the placenta subsequently, and the more safe passage of the fœtus. Long ago, Deleurye stated the objects and advantages of the practice explicitly, in the following terms:—"There are, notwithstanding, cases of placental presentation in which the placenta must be pierced: as, when it becomes necessary to terminate labour before the full term, without uterine contractions, in consequence of profuse flooding, and the fear of uterine inertia after this from the feebleness of the patient; then, with a thrust of a trocar, the evacuation of the waters is to be

[1] In Knauer's *Selectus Instrumentorum*, Tab. xxv. fig. 4.

[2] Scheibler's *Dissertatio de rumpendis velamentis*, etc.

[3] *Die Anzeigen der Mechanischen Hülfen bei Entbindungen*, etc., *mit Kupfern*, p. 436.

[4] See Kilian's *Operationslehre für Geburtshelfer*, 1843, vol. i. p. 248; and Siebold's *Abbildungen der Geburtshülfe*, p. 162.

[5] *Médecine Pratique*, tom. ii. pp. 350 and 352.

facilitated. The uterus, which by this evacuation ceases to be passively dilated, contracts and diminishes its volume, and we facilitate the time of election for delivering the woman with more safety."[1]

2. CASES OF PLACENTA PRÆVIA, IN WHICH *TURNING* FORMS THE PROPER PRACTICE.

I have already shown that several of the highest obstetric authorities look upon turning, and the artificial extraction of the infant, as the only advisable mode of treatment in every case of placenta prævia, and have quoted at length the opinions of Plenck, Denman, Merriman, Conquest, etc., to this effect. (See p. 182.) "When the placenta," says Dr. Rigby, "is fixed to the os uteri, nothing but turning the child will put a stop to the flooding."[2] "It may be laid down as a rule," observes Dr. Lee, "admitting of no exception, that where hemorrhage occurs from the placenta being situated over the os uteri, artificial delivery must be performed."[3] The same author, in a later publication, candidly and correctly states, in reference to this practice—the operation of turning in unavoidable hemorrhage:—"At the best, it is a dangerous operation, and you can never tell with certainty whether the patient will recover after its performance, however easily it may have been effected."[4]

The professed object of my present inquiry is to attempt to prove that the artificial removal of the placenta is a more safe and commendable operation in different forms of placental complication, than the artificial removal of the infant, is not attended with such extreme hazard to the life of the mother, and is specially applicable in those very cases in which turning is specially difficult and dangerous. There are, however, very many cases of placental presentation in which the artificial delivery, or turning, of the fœtus, will still remain as the most proper and legitimate plan of treatment. This remark applies, I believe, particularly—1. To those instances in which the child is alive, and at or near the full term of utero-gestation, when labour supervenes; and 2. Where fortunately the mother has borne a family previously, and the os uteri, by the time the hemorrhage proceeds to a dangerous extent, is either so dilated, or

[1] *Traité des Accouchemens*, p. 369.
[2] *Essay on Uterine Hemorrhage*, 6th edit., p. 91.
[3] *Researches on the Pathology and Treatment of Diseases of Women*, p. 207.
[4] *Lectures on the Theory and Practice of Midwifery*, p. 373.

dilatable, as to allow of the introduction of the hand of the operator and the extraction of the fœtus, without any fear of injury and laceration. Under such a condition, turning affords a very fair chance of life to the infant—and I presuppose the state of the os uteri to be such, that the danger of lacerating it, and thus leading either to subsequent hemorrhage or phlebitis, is not so great as to endanger the mother's recovery.[1]

Further, there is another set of cases of placental presentation, in which we must continue to be driven sooner or later to the adoption of turning. I have already shown that in a considerable portion of these presentations, the fœtus presents preternaturally, and in a number of them transversely. When the position of the fœtus is transverse, we must of course ultimately rectify it, and deliver by turning. But here we are driven to adopt the operation of turning, not in consequence of the peculiar presentation of the placenta, but in consequence of the peculiar presentation of the child. Knowing that we can at any time safely arrest the hemorrhage by the complete detachment of the placenta, we shall be further able, in such cases of cross-birth, to delay, if in other respects it is imperatively necessary, the operation of turning, and select for it that time which may be considered most compatible with the state and structure of the uterus, and the safety and life of the mother; and here also the adoption or not of the artificial detachment of the placenta will be greatly regulated by the ascertained death or life of the child.

3. CASES OF PLACENTA PRÆVIA IN WHICH *ARTIFICIAL DETACHMENT OF THE PLACENTA* FORMS THE PROPER TREATMENT.

When our practical acquaintance with this method of treatment becomes more extensive, and the measures for effecting it are simplified and better understood, it is possible that the practice itself may come to be applied in almost all the instances of placental presentation that I have alluded to under the two preceding heads.

[1] Cases of placental presentation, thus favourable for the safe operation of turning, are much more likely to be met with in hospital than in private practice, because hospital patients are generally near the full term of delivery before they are admitted, but of 33 cases mentioned by Dr. Lee, only 2 seem to have reached the full time. On the other hand, out of 11 cases which occurred in the Dublin Hospital during Dr. Collins' mastership, all had reached the full time except 2. If turning were applied in every case, such evident differences in the conditions of the patients must of necessity greatly modify the resulting maternal dangers and mortality.

This, however, is by no means the case during our present knowledge of the subject, and in the meantime I would wish to point out here in detail the special cases of placenta prævia in which the practice I propose seems to me to be more particularly applicable. These cases include, 1. Some complications on the part of the *mother*, especially such a degree of rigidity of the os uteri or vagina, or such obstructions of any form in the maternal passages or uterus itself, or such states of general constitutional exhaustion, as contra-indicate and prevent the safe exercise of the operation of turning. And, 2. Some complications on the part of the child, particularly its death or prematurity, rendering the operation of version unnecessary, so far as any view to its safety may bear upon the question, provided the mother can be delivered by means that afford greater safety to her. I shall now proceed to consider somewhat in detail each special set or division of cases to which the present mode of practice appears to be legitimately applicable.

First Series.

When the os and cervix uteri are too rigid or undilatable to allow of the safe exercise of the operation of turning.

Obstetric authors appear, as we have already seen, to be generally and perfectly agreed as to the propriety of turning in all cases of complete presentation of the placenta; they differ, however, from one another in regard to the time and circumstances which ought to be selected as most fit and safe for the performance of this operation in placenta prævia. Some strongly advise us to operate rather too soon than too late. Others as strenuously counsel us to beware of operating till the time that the os uteri is so dilated or dilatable as to permit of our interference, without any chance of injuring or lacerating the cervix in the passage of our hand, or the extraction of the infant. "In recommending early delivery, I think it right," says Dr. Rigby, the highest authority I can quote on such a subject, "to express a caution against the premature introduction of the hand, and the too forcible dilatation of the os uteri, before it is sufficiently relaxed by pain or discharge; for it is undoubtedly very certain that the turning may be performed too soon, as well as too late, and that the consequences of the one may be as destructive to the patient as the other. I am particularly led to observe this, as I have lately been informed, from very good authority—namely, a gentleman to

whom one of the cases occurred—of three unhappy instances of an error of this sort, which happened some years ago to three surgeons of established reputation, who, from the success they had met with in delivering several who were reduced to the last extremity, were encouraged to attempt it where but very little blood had been lost, in hopes that their patients' constitutions would suffer less injury, and their recovery be more speedy; which, till the experiment was made, was a very reasonable supposition. The women died, and they seemed convinced that their deaths were owing to the violence of being delivered too soon, and not to the loss of blood, or any other cause."[1]

On the other hand, Dr. Ingleby, the author of one of the best works that has been written on uterine hemorrhage, tells us that "a very experienced accoucheur, in whose practice about twenty cases of this description have occurred, informs me that those women who were delivered at an early period of gestation, recovered, but when delivery was postponed to a late period, the result was fatal. Similar answers have been given to the same inquiry by other gentlemen."[2]

Two great sources of danger, in fact, require to be taken into consideration in relation to the operation of turning, in each individual case of placental presentation—namely, *first*, The danger of too long a continuance of the hemorrhage, and consequently the exhaustion, and even the death of the patient, if the operation be not performed sufficiently early; and, *secondly*, The danger of contusion and laceration of the cervix uteri and its included vessels, if the operator, afraid of delay, and of the effects of the hemorrhage, proceeds to deliver too soon. And it is to be especially recollected in relation to this last point, that any degree of laceration in the tissues of the cervix uteri in a case of placenta prævia is fraught with unusual and imminent danger. The part of the uterine parietes to which the placenta is affixed becomes, as is well known, most freely supplied with blood-vessels; and there, in particular, the venous sinuses of the uterus are especially large and abundant. In placental presentations it is the cervix uteri itself that assumes this highly vascular condition; and hence any laceration or injury of it is much more liable to be followed, than under other positions of the placenta, with hemorrhage immediately after delivery, or with subsequent inflammation of its included and lacerated veins, giving rise to uterine phlebitis, a

[1] *Essay on Uterine Hemorrhage*, p. 37.
[2] *Practical Treatise on Uterine Hemorrhage*, p. 147.

disease which, under one or other of its many forms, is found to be one of the most common causes of death after the occurrence of placental presentations.

The two preceding and opposite causes of danger and death to which the mother is submitted under the operation of version in placental presentations, appear to be very equally balanced in their consequences; that is to say, amongst the number of fatal cases which occur in practice or are to be found upon record, nearly the same proportion appear to perish from the extent of the hemorrhage before delivery, or its subsequent effects (the results of protracting the delivery, and from post-partum flooding from the lacerated vessels of the cervix uteri, with uterine phlebitis, and all the other fatal consequences arising from injury and laceration of the vascular structures of the cervix, when the os is injured by being forced open too early).

As this appears a most important practical point to establish on sufficient statistical data, I have collected into the following table the dates of the death of the mother in 78 fatal cases of placenta prævia, reported by the different authors whose works I have quoted

Period of Death of the Mother in Fatal Cases of Placenta Prævia.

Reporters.	No. of Fatal Cases.	Died undelivered.	Died within 3 hours after delivery.	Within 48 hours.	At a later period.
Mauriceau . .	3	1	1	1	...
Giffard . .	7	...	6	1	...
Smellie . .	6	3	2	...	1
Rigby . .	11	2	3	3	3
Collins . .	2	...	2	...	...
Lachapelle . .	9	...	3	2	4
J. Ramsbotham .	9	1	7	1	...
F. Ramsbotham .	16	...	7	1	8
Lee . . .	15	1	5	2	7
Total . .	78	8	36	11	23

in a former page (p. 177). The table is constructed to show, *first*, The number of mothers who died undelivered; *secondly*, The number of those that sunk within three hours after delivery, and probably from exhaustion, under the hemorrhage preceding flooding, or from its continuance from the lacerated vessels of the cervix, after the emptying of the uterus; *thirdly*, The number that died within 48 hours after delivery, and hence, I suppose, from exhaustion under

hemorrhage and the operation of delivery; and *lastly*, The number of those that died at a later period, after the immediate danger from the hemorrhage and operation had subsided, and when the fatal result was apparently always, or almost always, the consequence of uterine phlebitis, in some of its manifold forms.

Some authors and practitioners seem to have fallen into the mistake of supposing that in all cases of placenta prævia the os uteri will be found dilated or dilatable by the time that the hemorrhage has taken place to such an extent as to endanger the life of the mother. It may be sufficient to quote, on such a point, the opinions of an author who has written one of the soundest and most classical professional works that we have in the English language: "In some cases," says Dr. Denman, "in which it has been presumed to be necessary to deliver the patient on account of the hemorrhage, in placenta prævia, the parts have been in such a state that the operation could not, it was thought, be performed with safety. Whenever the case demands the operation, on account of the danger of the hemorrhage, the state of the parts will, on this account, *always* allow it to be performed with safety, though not with equal facility."[1] It must, however, be confessed with regret that the opinion here expressed by Dr. Denman rather indicates the condition which we anxiously desire than that which we always meet with in practice. And our best practical authors seem to be becoming more and more agreed that cases of placenta prævia are constantly occurring, in which the hemorrhage may proceed to such a degree as to urgently demand artificial interference upon our part, in order to arrest its violence or complete the delivery, without the os uteri and passages being at the same time in such a condition as to permit of the safe passage of the hand into the uterus, or of the safe extraction of the infant from it.

"If," says Peu, "a pregnant woman is seized with considerable flooding, which does not cease, the secret is to deliver her as soon as possible. * * * For this, I always suppose that there is a sufficient opening. For to force and dilate the internal orifices of the womb is just so many deaths, or rather lives thrown away and sacrificed (*c'est autant de morts, ou de vies plûtôt qu'on precipite et qu'on prodigne.*) If, then, the smallness of the opening, or the extreme debility of the patient, render the thing visibly impossible, it is better to leave the case to nature, than to irritate the blood so as to augment the flooding without hope of alleviating it."[2]

[1] *Introduction to the Practice of Midwifery*, p. 530.

[2] *La Pratique des Accouchemens*, p. 516.

When treating of the subject of unavoidable hemorrhage, Professor Davis states, that he "had met with many examples even of fatal results of profuse uterine hemorrhage unaccompanied by any amount of dilatation of the orifice of the womb."[1] Dr. Hamilton, when speaking of placental presentations, tells us that in the month of September 1816, he was called to two cases where the patient seemed to be *in articulo* from the deluge of the discharge, and, nevertheless, where the os uteri was in the state of obstinate rigidity which Dr. Davis has described. "It has been advised," Dr. Rigby states, "never to introduce the hand till nature has shown some disposition to relieve herself, by the dilatation of the os uteri to the size of a shilling or a half-crown; and this rule is certainly founded on a rational principle; for when it is so much dilated, there is no doubt but the turning may be easily and safely effected; but from some of the annexed cases it appears, that a dilatation to this degree sometimes does *not take place at all*, and that even when the woman is dying from the great loss of blood, the uterus is very little open."[2] "There is not unfrequently," remarks Dr. Lee, "most profuse and alarming flooding from complete placental presentation, where the os uteri is so thick, rigid, and undilatable, that it is impossible to introduce the hand into the uterus without producing certain mischief."[3]

"Again, it is by no means impossible," Dr. Ramsbotham observes, "that such alarming symptoms (the patient faint, and gasping, and cold, etc.) may show themselves before the os uteri has acquired the diameter of half-a-crown, as to render it extremely hazardous for us to delay our means until that degree or dilatation is arrived at. The blood may be gushing forth in a copious and continued stream, or may be oozing away in a less violent though steady draining, or coagula of considerable size may be passing from the vagina every few minutes; and it must be evident to the least attentive observer, that such a state of things cannot be allowed to proceed unchecked. Two modes offer themselves for our choice: either immediate delivery, or endeavouring to restrain the flow, and delaying until the due degree of dilatation is effected. Our practice will mainly be guided by the state of the os uteri itself; if it appear soft, lax, and distensible, offering but little resistance to our fingers in the attempt at dilatation, we shall mostly be able, under

[1] *Principles and Practice of Obstetric Medicine*, p. 1040.
[2] *Essay on Uterine Hemorrhage*, p. 38.
[3] *Principles and Practice of Midwifery*, p. 373.

the use of sufficient caution, to pass the hand entirely through it without injury, even although its disc be not exceeding the diameter of a shilling; and, indeed, I have accomplished the operation of turning on some few occasions, under these unpromising circumstances, by slowly insinuating the fingers *seriatim*. Although, then, such a proceeding be not desirable, if it can be avoided, inasmuch as every minute's delay brings with it an augmentation of danger—we are fully justified in effecting the dilatation of the os uteri thus artificially, even when, at the commencement of our efforts, it will scarcely admit the introduction of the tips of two fingers."[1]

"I know," observes Dr. Collins, "of no circumstance *so much to be dreaded*, as the forcible introduction of the hand where the parts are in a rigid or unyielding state; for although turning the child is the established and most desirable practice, yet the success of this operation will mainly depend on the judgment of the practitioner in selecting the most proper and favourable time. Cases will happen where he is obliged either to suffer his patient to sink from loss of blood, or proceed to deliver when the parts are in an undilated and rigid state, in order to afford her the only chance of life; but dire necessity should alone compel him to hazard the consequences of such violence. We are well aware the os uteri will yield at a much earlier period after a severe loss of blood than under other circumstances; we are equally well aware of the great injury the patient sustains by delaying delivery beyond the earliest moment that the mouth of the womb will by gentle efforts permit the introduction of the hand; it is against *premature measures* we wish to guard the young practitioner; as every individual of experience will acknowledge the great embarrassment he not unfrequently has laboured under, in deciding on the time, beyond which to defer affording assistance were timorously to risk his patient's safety, and previous to which, delivery would be either impracticable, or, if effected by violent means, truly dangerous; for even a slight injury to the mouth of the womb will prove more fatal than an increased loss of blood, so long as the strength can possibly bear it."[2]

That the flooding in placental presentations sometimes proceeds to such an excess as to demand measures either for its suppression, or for the forcible delivery of the patient, *before* the os uteri is in such a dilated or dilatable state as to permit with safety to its structures of the operation of turning, admits of being still more

[1] *Obstetric Medicine and Surgery*, 2d edit. p. 387.

[2] *Practical Treatise on Midwifery*, p. 93.

forcibly illustrated by an appeal to the history of individual cases of unavoidable hemorrhage. As the matter is one of most important bearing upon the argument before us, I shall offer no apology for enforcing and extending the evidence in favour of it, by adducing some individual facts and instances in illustration of my present purpose.

"In no case," observes Dr. Edward Rigby, "is it proper or safe to force delivery by artificially dilating the os uteri, when it is contracted and unyielding; but where the placenta is presenting, it is peculiarly dangerous, for even slight laceration of the os uteri will be followed by serious consequences. Where the placenta is situated in the upper part of the uterus, it is of very little consequence if the edge of the os uteri has been torn somewhat during labour; but in the present case it is very different—the os uteri now plays the part of the fundus, its vessels are immensely dilated, and larger ones are ruptured, which cannot be closed by the finest contraction of the uterus. * * * Cases have occurred where the os uteri has been artificially dilated, where the child was turned and delivered with perfect safety, and the uterus contracted into a hard ball; in fact, everything seemed to have passed over favourably; a continued dribbling of blood has remained after labour, which resisted every attempt to check it; friction upon the abdomen, and other means for stopping hemorrhage by inducing firm contraction of the uterus, were of no use, for the uterus was already hard and well contracted; the patient has gradually become exhausted, and at last died: on examination after death, Professor Naegele has *invariably* found the os uteri more or less torn."[1]

We have sometimes proof afforded us in *post-mortem* examinations of the fact that unavoidable hemorrhage may proceed to a fatal extent during the first stage of labour, without the tissues of the os and cervix uteri ever dilating to such a degree as to allow of the introduction of the hand without laceration.

In his magnificent plates of the anatomy of the gravid uterus, Dr. William Hunter has given two representations of the uterus of a woman who died of unavoidable hemorrhage during the first stage of labour. She had reached the ninth month of pregnancy. The first plate (Tab. xi.) represents the external surface of the uterus, with the enormous uterine veins about the cervix much enlarged and injected. The second (Tab. xii.) shows the uterus opened, with the placenta fixed over the os uteri, and the infant presenting in the

[1] Rigby's *System of Midwifery*, p. 259.

second position of the head, or with the face looking to the left sacro-iliac synchondrosis.[1] The os uteri appears very small and unopened. The preparations of the parts in this case are still contained in the Hunterian Museum belonging to the University of Glasgow. On lately examining them, I found the os uteri apparently not opened to the size of a shilling, and the lips of the cervix, particularly on one side, so thick and turgid (they are correctly represented so in the plate) as to leave no doubt that it would have been physically impossible to distend the uterine orifice, so as to admit the hand without certain laceration. The placenta is partially detached and slightly lacerated upon its external surface opposite the os. In reference to this preparation, I may add one fact bearing upon the matter discussed in a former page, relative to the mode in which retrograde hemorrhage is prevented from the uterine veins after the placenta is detached. The veins, as I have said, are very large, as seen in the published plates, and are injected with yellow wax. There is, however, no appearance whatever of any of this wax having reached so far back as the utero-placental orifices left by the separation of the placenta.

Long ago Dr. Smellie detailed three cases of Cæsarean operation performed immediately after the mothers had died from unavoidable hemorrhage. These cases are interesting in a historical point of view, as affording some of the earliest evidence which we have on record of the occasional implantation and organic adhesion of the placenta to the interior of the cervix uteri being ascertained by actual dissection. They all occurred during the two years of 1747 and 1748.[2] One of the cases is further valuable in reference to our

[1] It has always appeared to me a remarkable fact that, both in this plate and in the beautiful engraving, Tab. iv., of the natural position of the fœtus in utero, Dr. Hunter, who is justly and deservedly celebrated for his accuracy and fidelity of observation, has represented the fœtus as lying in utero in a position which it very rarely occupies—so rarely, indeed, that Naegele avers he only met with it once as an original position in twelve hundred cases. Plates xv. and xxiii. represent the child in the third position ; none in the work shows it in the first or most frequent position. I may add that the "reversing" the infant is not a mistake of the engraver's, as I find it exists in the original drawings by Rymsdyk, which are still preserved in the museum. Some casts also, taken probably from the same preparations, show the fœtus placed in this unusual position.

[2] The first case in which there was *post-mortem* evidence of the organic implantation of the placenta over the os and cervix uteri, seems to have been that published by Petit in the *Mémoires de l'Académie* for 1723. It is well known that the general belief of accoucheurs was that the placenta was always originally affixed to the interior of the fundus or body of the uterus ; and when found at the os, it was believed to have separated and fallen down into that position. So late

present inquiry, as showing a perfectly undilatable state of the os uteri under fatal flooding from placental presentation. I shall append some details of it.

Case XLII.—*Cæsarean operation after death from unavoidable hemorrhage; rigid state of os uteri as found on dissection; its laceration under the attempt to open it.*—"The woman was turned of forty, of a gross habit, and had never borne a child." After a fall in the seventh month, she had repeated discharges of blood. Two or three weeks before her full time, she was taken with slight pains, upon which Dr. Smellie was called, and found the os uteri opened to about the size of a sixpence, and within it a soft substance that felt like the placenta. As she had rested but indifferently the preceding night, was faint and weak, and had some small returns of the discharge, Dr. Sands was consulted, and gave it as his opinion that it was still proper to support the patient's strength with broths and nourishing food, and more safe to wait till the slight pains should bring on the right labour, than to use any violence to deliver her immediately. "I was again," says Dr. Smellie, "called about nine o'clock the same night, when she was taken all of a sudden with frequent faintings, in one of which she expired as I entered the room. This sudden alteration prevented me from making any attempt at delivery; and, indeed, had not this event happened, I should have been afraid of her dying in the operation, because of her gross and weak habit of body. As soon as all present were satisfied that the person was dead, I opened her abdomen, and having taken out the child, examined the uterus. I found the placenta firmly adhering to its interior and posterior parts; about two fingers' breadth of its lower edge was separated from the os internum, which it covered; and this was what Dr. Sands and I had felt in the morning. Having extracted the secundines, *I tried with my hand to open the os internum from the inside of the uterus, which with great force I performed, not without tearing it about two inches on one side.*" "By this," he adds, "it appears how difficult it is to dilate this part in women going with a first child, especially when they are pretty old. Indeed, it is sometimes impossible to be done before they come to their full time, and even then not until the parts are thin, soft, and largely opened by previous labours."[1]

If, in such cases as the preceding, it were necessary, in consequence of the extent of the hemorrhage, to proceed to delivery, and

as 1717, Dr. Simpson, Professor of Anatomy at St. Andrews, published in the *Edinburgh Medical Essays*, vol. iv., a paper in which he attempted to prove "that the placenta *inviolably* adheres to the cavity of the fundus (uteri); with which it is ingraft, and can never again shift its place."

[1] *Cases in Midwifery*, vol. iii. Collection xxix. No. 1, Case ii. p. 412.—Dr. Rigby, in commenting upon this case of Dr. Smellie's, argues that the trial being made to open the mouth of the uterus after death, "when every strong membranous part is incapable of contraction and extension, is no proof that if the most favourable opportunity had been watched for, and a gradual and repeated endeavour to open it had been before made, it would not have succeeded."—*Essay on Uterine Hemorrhage*, p. 44. Dr. Rigby appears to forget that the examination of the uterus, and the laceration of the os, upon attempting to open it, occurred *immediately* after death, and as the dilatability of the part depends upon its physical rather than its vital conditions, we cannot believe that an os uteri which was thus found incapable of dilatation without tearing after death, could have been found during life, a few minutes previously, capable in any degree of dilata-

yet the os uteri were not more dilated or dilatable than it was found in Dr. Smellie's patient after death, it is evident that the forcible introduction of the hand into the os uteri, and the artificial extraction of the child through it, would necessarily give rise to lacerations of a greater or less extent in the tissues of the cervix, and such we find to be the fact in actual practice. The simple details of some cases may enforce this important point, by showing the difficulties of the practitioner, and the dangers of the patient under such a complication. For this purpose I shall quote *verbatim* the reports of two or three instances from the valuable and practical works of Dr. Collins and Dr. Lee.

Case XLIII.—*Profuse unavoidable hemorrhage; turning required while the passages were badly prepared; laceration of the cervix uteri; death.*—"W. S. was admitted, at her full time, November 12. She had been shedding occasionally for five days before, which reduced her to a state of great debility. There was no hemorrhage on her admission, but on examination, the placenta was found at the mouth of the womb, which was not more dilated than the size of a half-crown, with its edge thick, but not *very* rigid. As the discharge had ceased, and her strength was much exhausted, she was ordered to be kept perfectly cool and quiet, to have some cold chicken broth. About an hour and a half afterwards, suddenly, the most profuse hemorrhage set in, so much so, that in two or three minutes, the blood was running in every direction over the edge of the bed; this was consequent on some slight uterine action. There being no chance of life without speedy delivery, we determined to make the attempt, though the parts were badly prepared; accordingly the hand was very slowly and cautiously introduced, and the feet brought down with little exertion; the uterus acted strongly, and felt well contracted after delivery. The placenta came away with the child. Great debility succeeded the operation, with a slight discharge of blood at intervals; and on examining an hour after, a laceration of the neck of the uterus, anteriorly and to the right side, was discovered, commencing at its junction with the vagina, and extending upwards. She died shortly afterwards. It was her fourth child—a girl (living). Dissection verified the result of the vaginal examination."[1]

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tion, without the same laceration. Dr. Smellie has given an additional instance of Cæsarean operation, performed immediately after the death of the patient in unavoidable hemorrhage, with the view of saving the child. The dilatability of the os uteri was not in that instance in any way affected by the death of the mother; it was, as he describes, thin, soft, and open to the breadth of half-a-crown. "*I dilated it with ease*, which showed that if I had been sent for in the evening, she might have been safely delivered." On Dr. Smellie being called to this case, before he had time to put her in a position for delivery, the patient fainted away, was thrown into convulsions, and died instantly. Two or three years ago I had an opportunity of seeing the dissection of a woman who had died of accidental hemorrhage in the first stage of labour. The os uteri was dilated to nearly the size of a half-crown, but its edges were perfectly rigid, and undilatable without tearing.

[1] Collins' *Practical Treatise on Midwifery*, p. 97.

As we have seen in a previous extract, p. 273, no author seems to be more thoroughly impressed than Dr. Collins, with the necessity of not hastening the delivery in placental presentations, if it is at all possible to avoid it; and the above case affords an apt illustration of Dr. Lee's remark, that "it is sometimes absolutely necessary to deliver by turning, before the hand can possibly be introduced into the uterus, without producing fatal contusion or laceration of the part."[1] The following are analogous cases from Dr. Lee's own Clinical Reports:—

Case XLIV.—*Complete placental presentation, with exhausting hemorrhage; os uteri so rigid as not to allow the hand to pass; foot of the child seized through the os; forcible extraction of infant; death of the mother.*—"On the 12th of January 1839, Mr. Jones, of Carlisle Street, Soho Square, called me to see a lady in the eighth and a half month of pregnancy, who had been attacked with uterine hemorrhage a month before. It first took place without any accident or pain, and the quantity lost was about half-a-pint, and it produced little effect upon the constitution. She remained quiet for several days, and then got up, and only felt a little weak. For ten days she went about, but the hemorrhage returned on the fifteenth day after the first attack, but not to a great extent. Seven days after this, a third and more profuse hemorrhage took place: it gradually went off, but not so quickly as the other attacks. At one o'clock, 12th January, it was renewed to an alarming extent without any pain; about a quart of blood was suddenly lost, and she became extremely faint. At four A.M. the discharge still continued. When I first saw her, at seven o'clock, she felt faint; the pulse was rapid and feeble. The upper part of the vagina was filled with a large clot of blood, which adhered to the os uteri. By displacing this at the back part, I could distinctly feel the placenta adhering all round to the neck of the uterus, which was thick and rigid, and very little dilated. *The effect produced by the hemorrhage was so great, that it was evident death would soon take place if the delivery were not speedily completed; and the state of the orifice was such, that it was certain the hand could not be passed, but with the greatest difficulty.* At eight o'clock, Dr. Merriman saw her with us, and agreed that immediate delivery was necessary. I passed the right hand into the vagina, and insinuated my fingers between the uterus and placenta at the back part, and reached the membranes. But the *rigidity of the orifice was so great, that though I employed great force for a considerable time, I could not succeed* in getting the hand into the uterus. Dr. Merriman recommended rupturing the membranes, and I was proceeding to do this with the fingers, when I felt one of the feet of the child, which I grasped and brought down into the vagina enveloped in the membranes, which then gave way. Nearly half-an-hour elapsed before the version could be completed, and when it was effected, the neck of the uterus grasped the neck of the child so firmly, that I experienced the greatest difficulty in extracting the head, and not till I had made pressure for some time with the finger, and dilated the orifice of the uterus. A great discharge of blood instantly followed; the placenta was removed, and every means employed to stop the hemorrhage, but the breathing became hurried, the extremities cold, and she died in less than an hour after delivery. Dr. Merriman informed me, that a patient of his had actually died under similar circumstances

[1] *Lectures on Midwifery*, p. 373.

before the head could be extracted. He considers the tampon as of little or no use in such cases."[1]

Case XLV.—*Exhaustion; delivery of child postponed, from rigid state of os uteri; craniotomy; death of the mother immediately afterwards.*—"Mrs. H. was attacked with uterine hemorrhage at the beginning of February 1839, when seven and a half months pregnant. About twelve days after, it returned a second time, and yesterday morning a third time. About half-past twelve on the 5th of March, Dr. Davies requested me to see her with him, as the hemorrhage had returned in a dangerous form, and the orifice of the uterus was not in a condition to admit of delivery. We found the placenta adhering all round to the neck of the uterus, the orifice rigid and undilatable, and open to the extent of a crown, the head of the child presenting. By cold applied externally and internally, the hemorrhage was restrained till six o'clock in the morning, when it was renewed with violence. Dr. Davies then pressed his fingers through the placenta, tore it in two parts, and perforated the membranes. Half-past eight A.M., no hemorrhage; slight pains. Eleven A.M., no flooding; head pressing into the orifice of the uterus. *We were prevented at the time from perforating and extracting the head, by the rigid state of the os uteri.* She seemed to regain strength during the day; but at ten in the evening, without any further loss of blood, she began to breathe with great difficulty, the lips were livid, the hands and feet cold, and it was evident she would soon die undelivered, if we did not interfere. I opened the head, and extracted it with the greatest difficulty, in consequence of the firm and rigid state of the os uteri. The operation was scarcely completed before she was dead."[2]

Case XLVI.—*Turning attempted while the os uteri was too rigid to allow the hand to pass; two days subsequently, syncope from sudden flooding; turning; death of the mother.*—"On the 26th of April 1835, I was called to a patient of the St. Marylebone Infirmary, who was more than seven months pregnant, and had been attacked fourteen days before with alarming uterine hemorrhage. The first discharge of blood took place during the night, when she was at rest; it was not preceded by a sense of uneasiness about the uterus, and could be referred to no accident or injury of any kind.

"A considerable oozing of blood still continued, when I first saw her. The placenta presented; the orifice of the uterus was opened to the size of a crown-piece, but its margin was so hard and undilatable, that I found it impossible, without employing too great force, to pass the hand into the uterus. After a cautious trial for about half-an-hour to get the hand insinuated through the orifice, I was compelled to withdraw it altogether, as there was no hope of overcoming the resistance. On the 27th, the flow of blood continued, the strength remaining unimpaired, and the os uteri being not less unyielding. I resolved to wait till relaxation should take place, and moderate the discharge by the recumbent position, and the application of cold externally and internally. 28th.—A large quantity of blood suddenly escaped, which produced complete syncope. The countenance was afterwards pale, the extremities cold, and the pulse rapid and feeble. The os uteri being soft and dilatable, I immediately passed up the hand, and delivered by turning. The child was born alive. The placenta was removed soon after; but though no further loss of blood was experienced, she continued gradually to sink, and died in a few days."[3]

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[1] *Clinical Midwifery*, p. 155, Case 282. [2] *Ibid.* p. 157, Case 283.
[3] *Ibid.* p. 145.

Case XLVII.—*Severe and exhausting unavoidable hemorrhage with the os uteri perfectly undilatable; a foot caught through the undilated os, and the child extracted; mother in great danger, but recovered.*—"On the 7th of October 1835, I was requested by Mr. Gairdner, of Foley Place, to see a patient, residing in Frith Street, who had completed the seventh month of pregnancy, and had been attacked with uterine hemorrhage three weeks before. A slight discharge of blood had continued during the whole of this period, but it had produced little effect upon the system until a few hours before I saw her, when several pints of blood were suddenly discharged, and her whole strength seemed at once extinguished. The pulse was not perceptible; the extremities were cold, and the respiration feeble. The blood still continued to flow in great quantities, and it was evident death would soon take place if the uterus was not speedily emptied of its contents. The os uteri was not dilated to the size of a crown, and it was so rigid that I found it *absolutely impossible*, though I employed a degree of force scarcely justifiable, to pass more than three fingers within it. *The whole hand could not be made to pass, though it appeared certain that death would soon take place if delivery was not immediately accomplished.* On the fingers being withdrawn for a short time, the flooding continued. I made another effort to turn the child, but the resistance could not be overcome. I then pressed forward the fore and middle fingers of the right hand between the placenta and uterus, so as to reach the membranes, which I succeeded in tearing open. Pressing the fingers still forward, they came in contact with one of the feet, which they grasped and brought down into the vagina. This was pulled lower and lower till the whole extremities and nates were drawn into the os uteri; but so rigid did it continue to be, that although I exerted all the force I dared employ in dragging it down, half-an-hour elapsed before the pelvis of the child could be made to clear the orifice of the uterus. At last it was extracted with the placenta, and the hemorrhage ceased. A violent rigor followed, which threatened for a time to destroy the patient. Bottles of hot water were applied to the feet and pit of the stomach, the whole body was covered with hot blankets, and brandy was liberally administered. She slowly recovered from the immense loss of blood."[1]

But if we pass from individual to general facts, and attempt, with this view, to ascertain statistically the actual results of the practice of turning, under the complication of dangerous unavoidable hemorrhage in connection with a rigid or insufficiently dilated os uteri, the consequences are probably more disastrous than the remarks which I have made, or the cases I have quoted, under the present head, would lead us to suppose. Dr. Collins refers to cases of Dr. Ramsbotham's, in which, from the extent of the hemorrhage, and other symptoms, it was considered requisite to have recourse to turning with the os uteri still inadequately dilated. I find in Dr. Ramsbotham's work three additional instances of the same kind. In his *Clinical Midwifery*, Dr. Robert Lee states, that out of the thirty-five cases of placental presentation which he has recorded, "in eleven there had been more or less rigidity of the os uteri, with dangerous hemorrhage, and turning was performed in several of

[1] *Clinical Midwifery*, p. 146. Case 267.

them where the whole hand could not be introduced into the uterus."[1] Mauriceau, Lachapelle, and Collins, give each one or two similar instances. The following table shows an analytical view of the results of all these cases in reference to their influence upon the life of the mother.

MATERNAL MORTALITY IN CASES OF PROFUSE UNAVOIDABLE HEMORRHAGE WHILE THE OS UTERI WAS STILL IMPERFECTLY DILATED.

Reporters.	No. of Cases.	Mothers lost.	Mothers saved.
Mauriceau[2] . .	2	2	0
Lachapelle[3] . .	1	1	0
J. Ramsbotham[4] .	8	7	1
R. Lee[5] . . .	11	8	3
Collins[6] . . .	2	2	0
F. Ramsbotham[7] .	1	1	0
Total . .	25	21	4

This table sufficiently demonstrates the extreme danger which the mother incurs when forcible delivery is required, and attempted to be accomplished by the operation of version, with the os uteri still imperfectly dilated or dilatable. The result is, that, calculating from the data which the table affords, 17 per cent only of the mothers were saved and 83 per cent of them died under the complication—a result far greater than we find in any legitimatised surgical operation, and far more fatal than even the Cæsarean section itself.[8] But under this complication, we believe, that the complete

[1] *Clinical Midwifery*, p. 164. These eleven cases seem to be those marked as Nos. 266, 271, 272, 274, 277, 282, 283, 284, 285, 287, 289.

[2] *Observations sur la Grossesse et l'Accouchement des Femmes*, pp. 134, 363.

[3] *Pratique des Accouchemens*, tom. ii. case 9.

[4] *Observations in Midwifery*, Part. ii. Nos. 138, 139, 140, 141, 142, 144, 145, 149.

[5] *Clinical Midwifery*, p. 149, *et seq.*

[6] *Practical Treatise on Midwifery*, p. 97.

[7] *London Medical Gazette* for 1844, p. 279.

[8] Dr. Churchill states the following conclusions as the results of his extensive inquiries into the mortality attendant upon the Cæsarean operation. "Among British practitioners, in 40 cases, 11 mothers recovered and 29 died, or nearly three-fourths. Among Continental practitioners, out of 369 cases, 217 mothers recovered, and 152 died, or about 1 in 2½. Taking the entire number, which amounts to 409, we find that 228 mothers were saved, and 181 lost, or about 1 in 2¼."—*Researches in Operative Midwifery*, p. 221.

Dr. Churchill has further calculated, that in the Cæsarean operation, 160

artificial detachment of the placenta would be perfectly practicable in most, if not in all cases, and would consequently lead to the saving of many maternal lives. It would at once, as we have seen, arrest the hemorrhage which is the more immediate source of danger to the patient, and allow time for the os uteri to become relaxed and the labour to be completed, either by the natural pains, or otherwise, as might be afterwards found proper or necessary.

If our statistics are sufficiently extensive to be true, we might thus save 80 or 90 maternal lives out of every 100, by having recourse to artificial and complete detachment of the placenta, instead of losing 80 or 90 mothers out of every 100, by having recourse to the operation of turning. I shall afterwards take occasion to show, that in this complication the life of the child does not interfere in any material degree with these results, because the infant itself is almost invariably lost when turning is attempted under the particular complication in question.

Second Series.

In Cases of First Labour.

In another place I have endeavoured to demonstrate that almost all obstetric complications are more frequent and formidable in first than in subsequent labours—rupture of the uterus being the principal exception to this general rule. Placental presentations would seem to form another exceptional instance. I am not aware that any author alludes to this point, but it has struck me repeatedly in pursuing the statistical inquiries upon which the present memoir is founded. In the Dublin Lying-in Hospital, during the period of Dr. Collins' mastership, the proportion of first labours amounted to 30 per cent of all the deliveries. During the same period, eleven cases of placental presentation were observed in the hospital. In not one of the eleven did this complication occur in first labour.[1] In the various reports of cases of placenta prævia, by Giffard, Smellie, Rigby, Clarke, Collins, Lee, and Ramsbotham, I find in all 55 instances in which the number of the pregnancy is mentioned.[2] In 3 only out

children were saved, and 64 lost out of 224. We shall see afterwards, that on the other hand far more children are lost than saved in turning in placental presentation, with an undilated os uteri.

[1] *Practical Treatise*, Table, pp. 173, 175, Cases Nos. 4, 17, 33, 84, 50, 72, 77, 83, 89, 92, 119.

[2] Mauriceau does not mention the number of the pregnancy in any of his cases of placenta prævia. Giffard mentions it in 2—See his *Cases in Midwifery*, pp.

of these 55 cases, was the accident observed in a first pregnancy. Out of 81 cases, collected from our own General Table of Cases in Section III., with the number of the labour noted, the patient was pregnant for the first time in 8 instances. (See p. 195.)

Thus, adding these two collections of data together, we have 136 cases of placental presentation, and 11 only of these were observed in first labours.

If the rarity of placental presentations came to be fully established in first pregnancies by more extensive data,[1] may it not afford us some clue to the explanation of the cause or causes leading to the origin or production of that deviation in the site of the development of the placenta which constitutes placenta prævia?

But though placental presentations seem to occur rarely in first pregnancies, yet when they are met with, they are liable to exhibit unusual difficulties in consequence of the maternal passages being less dilated and dilatable than in women who have previously borne a family. Hence the labour is slower, and the hemorrhage consequently longer and more exhausting, before the parts are sufficiently relaxed, to admit with safety of either the artificial or natural delivery of the infant. In speaking upon this point, in connection with the treatment of unavoidable hemorrhage, Dr. Smellie justly observes, "the younger the woman is with child, the greater is the difficulty in opening the *os internum*, and more so in the *first* child, especially if she is past the age of thirty-five."[2] In a previous page

203, and 492; neither of them first labours. Smellie notices it in 9 cases—*Midwifery*, vol. ii. pp. 308, 310, 311; and vol. iii. pp. 141, 162, 178, 409, 412, 415; one of them a first pregnancy. Rigby states it in 9 instances—*Essay on Uterine Hemorrhage*, 6th edit., pp. 203, 209, 218, 224, 232, 238, 240, 246, 253; none of them primiparæ. Clarke, in 4 cases—*Trans. of King and Queen's Coll. of Phys.*, vol. i. p. 380; one of which was a first labour. Lee, in 4 cases, reports the number of the pregnancy—*Clinical Midwifery*, cases 268, 272, 285, 288; all the patients had borne children previously. Ramsbotham records the number of the pregnancy in 6 of his cases—*Observations in Midwifery*, 1st edition, pp. 195, 200, 202, 206, 216, 233; one of them only was confined for the first time.

[1] The only evidence to the contrary, that I have been able to find, is afforded by Madame Lachapelle. She states that in her 16 placental presentations, 6 were labours with first children. Is this in any degree explicable by the kind of patients resorting to the Maternité Hospital of Paris, where Madame Lachapelle's observations were made? Are the patients in a great proportion about to be confined of illegitimate children, and pregnant for the first time?

[2] *Treatise on Midwifery*, vol. i. p. 332. Dr. Rigby, *Essay on Hemorrhage*, p. 36, and Dr. Dewees, *System of Midwifery*, p. 385, both advert to the difficulty which is apt to be met with in making a proper examination even of the presenting part in unavoidable hemorrhage, occurring with a first child. It must be acknowledged," to quote Dr. Rigby, "indeed, that it may sometimes happen, that

(p. 276) I have already quoted from Dr. Smellie an account of the post-mortem appearances and state of the os uteri, which he observed in a patient that had died in her first pregnancy, of unavoidable hemorrhage. Adverting to the force required to open the os uteri in that instance after death, Dr. Smellie observes, "By this it appears how difficult it is to dilate this part in women going of a *first* child, especially when they are pretty old. Indeed it is sometimes impossible to be done before they come to their full time, and even then, not until the parts are thin, soft, and largely opened by previous labours."[1]

In consequence of the preceding circumstances rendering a first labour with unavoidable hemorrhage both more tedious in its course, before artificial delivery can be adopted, and the artificial delivery itself more difficult of execution after it is had recourse to, placental presentations, with this complication, would appear to be very dangerous and fatal to the mother. Out of 10 cases of unavoidable hemorrhage in connection with first labour, which I find in the reports of Smellie, Clarke, Lachapelle, and Drs. J. and F. Ramsbotham, 7 of the mothers died. One or two cases may serve to illustrate the difficulties and dangers to which I have adverted. Dr. Francis Ramsbotham has given the following instance among his elaborate and valuable tables and notes of the obstetric practice of the London Maternity Charity.

Case XLVIII.—*Unavoidable hemorrhage with a first child; excessive rigidity; turning and perforation of the infant's head; death of the mother.*—The patient, the subject of this case, "was more than 40 years old, and it was her first child; there was excessive rigidity of the os uteri and other structures." When first examined, the os uteri was not dilated to more than the size of a shilling. A catheter was passed into the uterus "by the side of the placenta," and the membranes were thus ruptured. This proceeding did not arrest the hemorrhage, and two hours after, delivery by turning was proceeded with. "Great difficulty" was experienced in introducing the hand and extracting the body of the child. The head was perforated to enable it to pass. "The placenta was immediately expelled, and although she had spoken cheerfully the minute before, she expired suddenly directly it was born."[2]

Case XLIX.—*Placental presentation in a first labour; turning, with os uteri, etc., offering resistance; death of the mother in three days afterwards.*—The case is detailed by Dr. Ramsbotham, in his *Practical Observations*. The patient was in

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at the very first coming on of the complaint, if the discharge be small, and more especially if it be the patient's first child, and the parts be close and unyielding, the admission of the hand into the vagina, as I have directed, will be attended with the utmost difficulty, and perhaps be almost impracticable."

[1] *Midwifery*, vol. iii. p. 414.

[2] *London Medical Gazette* for 1844, p. 279.

the eighth month of pregnancy with her first child. During the preceding month she had had repeated attacks of hemorrhage, which subsided spontaneously. Upon making an examination, "although the os uteri was rigid and but little opened," the placenta could be detected. She continued free from any discharge the whole of the two following days, when a more violent return of hemorrhage occurred. The operation of turning was proceeded to. "The external parts, the vagina and the os uteri, had shown little disposition to give way." The os uteri "offered considerable resistance" to the entrance of the hand, "binding it tightly around like a cord." This was overcome, a foot was seized, and the breech brought down —uterine action became strong and "expelled the rest of the child alive." After delivery there was no farther loss; she was, however, much exhausted. On the second day she was attacked with vomitings of a dark greenish fluid, and complained of pain in the belly, which felt tender and swelled; the pulse was small and quick. In the course of the night she expired. "A post-mortem examination was not allowed; yet I could not," observes Dr. Ramsbotham, "divest myself of the suspicion, that some injury was inflicted upon the parts in the act of delivery, although I was not aware of such a fact at the moment." [1]

After what I have stated under the preceding division, upon rigidity of the os uteri in placental presentations, the practical inference which I would wish to draw from the above remarks and cases, concerning unavoidable hemorrhage in first labours, is obvious. In the present, as in the former instance, and for the same reasons, I am inclined to believe, that the complete separation and extraction of the placenta will be found more safe and far more practicable in the generality of first pregnancies with unavoidable hemorrhage, than the forced delivery of the infant by turning. The os uteri, however, in some such cases, may be found, at the time required, sufficiently dilated or dilatable to allow of the artificial extraction of the infant, provided that plan be deemed, in other respects, proper and preferable. I here speak of the propriety of the separation of the placenta in first pregnancies, because I believe it will be more frequently found the proper line of proceeding in first than in subsequent deliveries, in which the passages yield earlier and more speedily and readily under the relaxing effects of the labour pains and the hemorrhage, and permit earlier and more safely of artificial delivery.

SUMMARY OF PRINCIPLES OF TREATMENT IN PLACENTAL PRESENTATIONS, ETC.[2]

In a late very interesting and very able paper on unavoidable hemorrhage, published in the *Lancet* for March 27th, I observe that

[1] *Practical Observations*, part ii. p. 206.

[2] See *Lancet*, May 8, 1847, p. 479.

the author, Mr. Barnes, argues on the idea that I recommend the complete separation and detachment of the placenta before the child as a general rule of practice in all cases of placental presentation. Many other members of the profession appear to have had the same impression. I have always, however, maintained a very different doctrine. From the first observations which I published on the subject, up to the present time, I have upheld that the practice of detaching the placenta before the child, in unavoidable hemorrhage, was a method to be had recourse to in cases where the other recognised modes of management were insufficient or unsafe, or altogether impossible of application; and I have always looked upon this new method as possessing especial value, from its thus presenting to us a rational means of treatment in precisely those more formidable varieties of this obstetric complication, in which all former plans of practice were attended with extreme hazard or extreme difficulty.

As I am anxious to avoid future error and misconception on this head, I would beg leave here to take the liberty of enumerating briefly, and without entering into special details, the different general principles of treatment which, in my humble opinion, ought to guide our practice in this important and anxious class of cases.

Setting aside, then, those minor and palliative measures for moderating the attendant flooding that are generally adopted by practitioners in all cases of uterine hemorrhage, where time permits of their employment (such as quietude, the supine position, cold, etc.), I hold that our management of placental presentations, when either labour or such severe flooding as demands interference does at last supervene, should be regulated on the following principles:—

I. *In some cases no active interference is required.*—In placental presentations, we deem ourselves called upon to interfere operatively, with the avowed object and purpose of saving the patient from the dangers of the attendant hemorrhage. Hence it necessarily follows that it would not be requisite to adopt any special form of artificial aid or delivery, if, in any case or cases, this complication were accompanied with little or no flooding. Now, in some instances of partial presentation of the placenta, the flooding ceases altogether, or abates to a safe degree, when, during the natural progress of labour, the membranes rupture and the head descends. And in some rare cases of complete presentation of the placenta, where the vascular bleeding structure of the placental mass has become obstructed and obliterated previously to the supervention of labour,

little or no hemorrhage has accompanied the process of delivery. In other instances, before any operative aid can be applied, the hemorrhage suddenly and entirely ceases, in consequence of the placenta becoming totally separated and expelled by the advancing head of the infant. Under such circumstances, and others, where the present or prospective dangers attendant upon operative interference would be evidently greater than the present or prospective dangers attendant upon the existing degree of hemorrhage, any form of forced delivery would, I believe, be improper. But cases of placental presentation, in which we can thus leave the delivery altogether to Nature, are rare. Generally we require to adopt some active measures, with the special object of saving the patient from the actual or threatened dangers of the hemorrhage. These measures should, I conceive, be one or other of the plans which I have now to proceed to mention—viz. 1, the artificial evacuation of the liquor amnii; or, 2, the artificial extraction of the child; or, 3, the artificial separation of the placenta.

II. *Artificial Evacuation of the Liquor Amnii.*—In partial presentations of the placenta, rupturing the exposed portion of membranes (according to those principles that are generally followed in accidental floodings) is a measure which sometimes proves quite adequate to arrest or abate the hemorrhage to such an extent, that the delivery may be afterwards entirely committed to the efforts of Nature. Various old authors, as Daventer, Deleurye, and Astruc, have described this same plan of treatment as applicable to complete, as well as to partial, presentations of the placenta, with this difference, that in the complete variety the liquor amnii is evacuated, not by puncturing the membranes only, but by perforating the opposing placental structure with a trocar, catheter, or other analogous instrument. And the later records of midwifery contain several cases in which this perforation of the placenta has, in complete presentations of the organ, been successfully adopted, both as regards the mother and the infant.

Several high authorities, however, in midwifery, have altogether repudiated the evacuation of the liquor amnii, both in partial and in complete placental presentations. They have done so principally under the idea, that if this measure failed to suppress the flooding, the previous escape of the waters would render any subsequent practice that might be required, more difficult of execution. This objection certainly applies to turning, as a subsequent practice, but it does not apply to artificial detachment of the placenta as an ulterior measure of treatment.

The artificial evacuation of the liquor amnii, by perforating either the placenta or membranes, affords assuredly a simple, but by no means a certain, method of restraining the flooding in placenta prævia. It is a practice which is undoubtedly attended with less success in unavoidable than in accidental hemorrhage. But still I believe it to be a mode of treatment to which we may occasionally have recourse with great advantage, especially if there is originally a large quantity of liquor amnii present, and if the flooding is great, while the os uteri is still small and undilatable. We must beware, however, of trusting too much or too long to this, or to any mere palliative measures. Whatever we do, should, if possible, be always done before the hemorrhage is allowed to proceed to such an extent as to induce any very marked symptoms of constitutional debility and depression in our patient. If a decided state of exhaustion has been allowed to supervene, either of the two remaining and ulterior measures, extraction of the child or extraction of the placenta, will be but too liable to prove futile and unsuccessful in their results.

III. *Artificial Extraction of the Child.*—This forms the general principle of management upon which unavoidable hemorrhage has hitherto been treated by most authors and practitioners. The professed object of the practice is this: by forcing the delivery of the child, and thus emptying the uterus, the organ is thrown into full contraction, and hence further loss of blood prevented. The mode in which the indication is fulfilled, is, in some degree, regulated by the state of advancement of the infant, its presentation, etc. In a great proportion of cases the accompanying hemorrhage requires interference at so early a stage of the labour, that the only proper and possible mode of delivery is by the operation of turning; and various authors, as Drs. Denman, Burns, Hamilton, Conquest, and others, speak of turning as the *sole* and *only* mode of treatment applicable to cases of placental presentation. The great objection to it is the imminent danger which the mother necessarily runs from the risk of some laceration of the cervix uteri during this mode of forcible delivery; and any degree of laceration of this part is especially dangerous in placental presentations; for in placenta prævia the structure of the cervix is extremely vascular, being permeated by those numerous and enlarged vessels which are always developed, in a high degree, in the uterine walls opposite the seat of the placenta. The laceration of these vessels leads to immediate danger, from draining hemorrhage after delivery, and to more remote danger, from inflammation being liable to spring up in the

torn and wounded sinuses of this part, and extreme uterine phlebitis following as a direct consequence. But still I hold turning to be the proper mode of practice in unavoidable hemorrhages which cannot be restrained by less active measures, and where immediate delivery is demanded, with the os uteri well dilated, or easily dilatable, and the child still alive, or presenting transversely.

Besides turning, other modes of artificial delivery of the infant are occasionally resorted to in placental presentations. If the attendant flooding is such as not to require forced delivery till after the waters are evacuated, and the head well advanced in the passages, then version would be dangerous and inapplicable, and the use of the forceps offers the safest and easiest mode of extracting the infant. Further, in original pelvic presentations, extraction may be at any time effected, when required, by seizing and dragging at the feet of the child.

IV. *Artificial Separation of the Placenta.*—The arrestment of unavoidable flooding by total detachment of the placenta should, I believe, be our line of practice when the combination of circumstances is as follows—viz. the hemorrhage is so great as to show the necessity of interference, and is not restrained or restrainable by milder measures, such as the evacuation of the liquor amnii; but, at the same time, turning, or any other mode of immediate and forcible delivery of the child, is especially hazardous or impracticable, in consequence of the undilated or undeveloped state of the os uteri, the contraction of the pelvic passages, etc. Or, again, the death, prematurity, or non-viability of the infant, may not require us to adopt modes of delivery for its sake, that are accompanied (as turning is) with much peril to the mother, provided we have a simpler and safer means, such as the detachment of the placenta, for at once commanding and restraining the hemorrhage, and guarding the life of the parent against the dangers of its continuance. Hence, as I have elsewhere stated, I believe that the suppression of the flooding by the total detachment of the placenta will be found the proper line of practice in severe cases of unavoidable hemorrhage, complicated with an os uteri so insufficiently dilated and undilatable as not to allow of version being performed with perfect safety to the mother: therefore, in most primiparæ; in many cases in which placental presentations are, as very often happens, connected with premature labour and imperfect development of the cervix and os uteri; in labours supervening earlier than the seventh month; when the uterus is too contracted to

allow of turning; when the pelvis or passages of the mother are organically contracted; when the child is dead; when it is premature and not viable; and where the mother is in such an extreme state of exhaustion as to be unable, without immediate peril of life, to be submitted to the shock and dangers of turning, or forcible delivery of the infant. This enumeration is far from comprehending all the forms of placental presentations that are met with in practice; but it certainly includes a considerable proportion of the cases of this obstetric complication, and among them, all, or almost all, of the most dangerous and most difficult varieties of unavoidable hemorrhage. In adopting the practice, one error, which I would strongly protest against, has been committed in some instances. Besides completely detaching and extracting the placenta, the child has subsequently been extracted by direct operative interference. If the hemorrhage ceases, as it usually does, upon the placenta being completely separated, the expulsion of the child should be subsequently left to nature, unless it present preternaturally, or the labour afterwards show any kind of complication which of itself would require operative interference under any other circumstances. Both to detach the placenta and extract the child would be hazarding a double instead of a single operation.

Comparative Mortality attendant upon Turning, and upon the Total Separation of the Placenta.—One circumstance which strongly led me to advocate, in unavoidable hemorrhage, the preference of the detachment of the placenta to the operation of turning the child, was the fact of the great mortality which followed the latter operation, as contrasted with the few mothers that died when the placenta was spontaneously expelled, or accidentally extracted before the infant. In speaking of the relative maternal mortality resulting from the two modes of practice, Mr. Barnes very properly points out that when I spoke of the mortality attendant upon the separation of the placenta before the child as amounting to 1 in 14 only, 10 mothers in 141 having died, I had included cases in which the placenta was thrown off spontaneously before the child, along with others in which it was artificially detached; and he doubts if the results would not be "widely different" if the statistics comprehended the latter class of cases only, "in which the severe operation of detaching the placenta by the introduction of the hand had been resorted to." The best answer to this objection consists in a statement of the results hitherto obtained from the practice of artificially detaching the placenta.

"Seventeen cases," says Dr. West,[1] "have been recorded in the English journals during the past fifteen months, of detachment of the placenta before the birth of the child, in cases of placenta prævia. In the case recorded by Dr. Simpson, to whom it had been communicated by Mr. Cripps, the placenta was removed by an ignorant midwife, and ten hours elapsed before the child was born, during which time, however, no hemorrhage took place. In 16 out of the 17 cases, the bleeding is said to have ceased immediately on the detachment of the placenta; but Dr. Everitt mentions, that although the flooding abated on the separation of the placenta, it did not entirely cease until after the application of cold externally; and he insists on the fact as proving, in cases of this kind, the hemorrhage comes from the uterine as well as the placental ends of the lacerated veins. The life of the mother was preserved in every case but one (out of the 17), and then the previous hemorrhage had been so profuse as almost to exhaust the patient, who died three hours after delivery. All the children were still-born, except in the case related by Mr. Stickings."

I do not stop to inquire whether, in one and all of these 17 cases, the artificial detachment and extraction of the placenta ought to have been followed. At present I adduce them, not as affording evidence of the propriety of the practice, but as affording evidence of its safety.

In proof of the maternal mortality under the old and recognised forms of practice being greatly higher than under the proposed plan of the extraction of the placenta before the child, Mr. Barnes refers, apparently with some hesitation, to the statistics collected by Dr. Churchill and myself, as showing that 1 in every 3 mothers was usually lost in placental presentations. Among 174 cases of unavoidable hemorrhage collected by Dr. Churchill, 48 mothers died. I have now before me (see page 179) a carefully collected list of 654 cases of placental presentations reported by Mauriceau, Portal, Giffard, Smellie, Rigby, Clarke and Collins, Schweighauser, Lachapelle, Drs. John and Francis Ramsbotham, Lee, Lever, and Wilson. Among these 654 cases, 180 mothers died, or 1 in $3\frac{6}{10}$. In corroboration of the correctness of the statistical view which Dr. Churchill and I have taken of the extent of maternal mortality in unavoidable hemorrhage, I would further beg to refer Mr. Barnes

[1] See his able Midwifery Report for 1845-46, in Dr. Forbes's *Review* for January 1847, p. 286.

to the observations of Dr. Robert Lee.[1] Dr. Lee states a number of statistical facts regarding uterine hemorrhage from placental presentations, and, amongst other matters, he mentions the result to the mothers in a considerable number of cases. I shall throw all his evidence on this last point into a tabular form :—

Maternal Mortality in 72 Cases of Placental Presentations, as noted by Dr. Lee.

Reporters.	No. of Cases Reported.	No. of Mothers Lost.
Dr. Clarke .	14	1
Dr. Collins .	11	2
Dr. Ramsbotham	19	8
Dr. Lee . .	38	14
	72	25

Hence, according to Dr. Lee's collection of statistics, the maternal mortality in unavoidable hemorrhage, amounting to 25 in 72 cases, is rather more than 1 in 3. And this evidence of Dr. Lee will probably be regarded as the stronger, seeing that it is totally unprejudiced in its character, for, in 1845, Dr. Lee called into doubt the accuracy of all collections of statistical data, made by others, which led to the idea that the general maternal mortality in unavoidable hemorrhage was so great as to approach 1 in 3. At that time he was, I believe, unaware of the general result of his own previously published collection of statistical data relative to the point in question.

SPECIAL AVERAGE AMOUNT OF MATERNAL MORTALITY OBSERVED IN CASES OF TURNING FOR PLACENTA PRÆVIA.[2]

On another occasion I took an opportunity of stating, and proving by comparative statistics, that "those mothers who are the subjects of placental presentations are submitted to as great peril of life

[1] *Midwifery Lectures*, pp. 370, 371, published in 1844.
[2] See *Lancet*, October 9, 1847, p. 381.

from this obstetric complication as they would be if seized with yellow fever or malignant cholera." This refers to placental presentations taken irrespectively of any special forms of treatment, or, indeed, of any treatment at all. The table on page 179 is a proof of this, 180 mothers dying out of 654 cases, or 1 in $3\frac{6}{10}$. But though placental presentations, taken as a whole, may thus be so very fatal, it has been repeatedly argued, that in cases of unavoidable hemorrhage, in which the child is extracted by the operation of *turning*, the mortality must be different and less in amount. I doubt this entirely. Out of the 654 cases forming the table previously published, in 421 the child was extracted by turning. The following table shows the result :—

Table of Maternal Mortality in Placental Presentations treated by the Operation of Turning the Child.

Reporters.	Number of Cases.	Mothers lost.
Mauriceau . . .	14	1
Portal . . .	12	1
Giffard . . .	18	5
Smellie . . .	8	3
Rigby	35	9
Clarke and Collins .	8	4
Busch . . .	5	2
Schweighauser . .	46	11
Lachapelle . . .	13	6
J. Ramsbotham . .	86	40
F. Ramsbotham . .	96	37 [1]
Lever . . .	30	7
Lee	28	10
Wilson . . .	22	8
	421	144

[1] In the controversy with Dr. Lee, the latter considered that 26 of the Drs. Ramsbotham's cases ought not to be included in this table. If these, however, be omitted, there will remain 156 cases ; the result of which was as follows :—

Table of 156 *selected Cases of Turning in Placental Presentations, the Operation not having been over-delayed.*

No. of Cases.	Maternal Deaths.	Proportion of Maternal Deaths.
156	48	1 in $3\frac{3}{10}$

See particulars in *Lancet* for November 1847, p. 520.

From the above table it appears, that out of 421 placental presentations in which the child was removed by turning, the result was fatal to the mother in 144 instances; or, in other words, the mothers were lost in the proportion of more than one in three (one in two and nine-tenths). Upon the continent of Europe, the Cæsarean operation—reputed the severest in midwifery—has been fatal to the mothers, according to Dr. Churchill, in 154 out of 371 cases, or in 1 in $2\frac{4}{10}$.

Lithotomy—generally regarded as one of the most formidable operations in surgery—is calculated by Drs. Willis and Inman to have an average mortality of one in every seven or eight operated upon. The fatality attendant upon placental presentations treated by the obstetric operation of turning, is more than twice greater than that accompanying the surgical operation of lithotomy.

When turning is had recourse to in some of those more severe complications of unavoidable hemorrhage, which I have proposed to treat by the total detachment of the placenta, the maternal mortality is still even greater and more startling. Out of *eleven* cases of placental presentation reported by Dr. Lee in his *Clinical Midwifery*, and where there was the combination of "more or less *rigidity* of the os uteri with dangerous hemorrhage," *eight* of the mothers died, or seventy-two per cent; and two out of the only three who did survive, evidently made very narrow escapes from death.

After giving a tabular view of these eleven cases on another occasion,[1] I observed, that consequently "the operation of turning and artificial delivery in unavoidable hemorrhage, with the os uteri imperfectly dilated, would, from these and other cases, appear to be more deadly than any operation that is deemed *justifiable* in the whole circle of surgery." And I sincerely believe that in such cases the simple but complete separation of the placenta without its removal, which could be accomplished in circumstances under which turning was utterly impracticable, would at once arrest the hemorrhage, and thus place the mother in a state of comparative safety. "But," anxiously argues Dr. Lee, "to have attempted in those cases to tear away" (separate) "the placenta, would have been an act of insanity." "It would, undoubtedly," as anxiously argued Dr. Brown, some twenty or thirty years ago, be *downright* madness to imagine they will condescend to encourage vaccination."[2]

[1] *Medical Gazette* for 1845, p. 1013.

[2] *Edinburgh Medical and Surgical Journal*, vol xv. p. 64.

TREATMENT OF PLACENTA PRÆVIA BY PARTIAL SEPARATION OF THE PLACENTA.[1]

Sometimes the hemorrhage might be stopped by simply separating a little more of the placenta than what had already been detached; for, as the bleeding came from the line of vessels between the placenta and the uterus which are on the stretch, the separation relieved the tension, and by this practice there is a greater chance of saving the child.

ALBUMINURIA IN PUERPERAL CONVULSIONS, ETC.

Co-existence of Puerperal Convulsions with Albuminuria.[2]

The third case alluded to in the text offered me the first opportunity of confirming, by inspection after death, an opinion that I had been led to adopt from the examination of the symptoms during life, and had publicly taught for the last two sessions—viz. that patients attacked with puerperal convulsions had almost invariably albuminous urine, and some accompanying, or rather preceding, dropsical complications, and hence probably granular renal disease. Pathologists are now well aware of the occasional great tendency to convulsions and other bad symptoms in patients affected with Bright's disease, and of the influence which that affection has over the progress of both medical and surgical affections. The present occasion is not a proper field to discuss its bearings in relation to parturition and the puerperal state, or otherwise its importance might be easily illustrated. A very able and zealous investigator (Mr. Lever of Guy's Hospital) has already so far entered on the inquiry, by pointing out that, as in one of the cases adverted to in

[1] See Proceedings of Edinburgh Obstetrical Society, January 28, 1870, in *Edinburgh Medical Journal*, April 1870, p. 943.

[2] Footnote to an article on the Uterine Sound in *London and Edinburgh Monthly Journal of Medical Science*, November 1843, p. 1015.

the text, inertia of the uterus and hemorrhage are sometimes the accompaniments, if not the consequences, of an albuminous state of the urine, and granular disease of the kidney.[1]

LESIONS OF THE NERVOUS SYSTEM, ETC., IN THE PARTURIENT FEMALE, CONNECTED WITH ALBUMINURIA.[2]

1. Albuminuria, when present during the last periods of pregnancy and labour, denotes a great and marked *tendency* to puerperal convulsions.

2. Albuminuria, in the pregnant and puerperal state, sometimes gives rise to other and more anomalous derangements of the nervous system, without proceeding to convulsions; and I have especially observed states of local paralysis and neuralgia in the extremities, functional lesions of sight (amaurosis, etc.) and hearing; hemiplegia and paraplegia more or less fully developed.

3. Œdema of the face and hands, going on occasionally to general anasarca, is one of the most frequent results of albuminuria in the pregnant female.

4. The presence of this œdema (3), or of any of the lesions of the nervous system (2), with or without the œdema, should always make us suspect albuminuria; and, if our suspicions are verified by the state of the urine, we should diligently guard, by antiphlogistic means, etc., against the supervention of puerperal convulsions.

5. Albuminuria, and its effects (1, 2, 3), are far more common in first than in later labours, and these constitute a disease which in general disappears entirely after delivery. But I have seen one case commencing with slight blindness, but no œdema, and ending gradually in hemiplegia, where the palsy partially remained after delivery, and after the disappearance of the albuminuria. In another, amaurosis came on with delivery, and had been present for six months when I first saw her. She had no œdema or other symptom of albuminuria except the amaurosis; but, on testing the urine, it was highly albuminous.

6. Albuminuria, with convulsions, etc., occurring in any labour later than the first, generally results from fixed granular disease of the kidney, and does not disappear after delivery.

[1] See *Guy's Hospital Reports*, vol. vii. 1842, p. 325.

[2] See Proceedings of Edinburgh Obstetrical Society, June 15, 1847, in *Edinburgh Monthly Journal of Medical Science*, Oct. 1847, p. 288.

7. Perhaps in puerperal convulsions, etc., produced by albuminuria, the immediate pathological cause of the nervous lesions is some unascertained but poisoned state of the blood. Was there a morbid quantity of urea in the blood? In several specimens of the blood of patients suffering under severe puerperal convulsions, furnished by me to Dr. Christison and Dr. Douglas Maclagan, these gentlemen have been unable to detect any great traces of urea. Is the poisoning material, caseine in morbid quantity or quality? The dependence, shown by Gluge and others, of albuminuria upon stearosis of the kidney, makes this connection worthy perhaps of some inquiry.

8. In cases of severe puerperal convulsions, etc., from albuminuria, the renal secretion is in general greatly diminished, and I have found active diuretics apparently of great use along with or after venesection, antimony, etc., especially where the case was offering to become prolonged.

9. Sometimes hemiplegia supervenes during pregnancy and labour without albuminuria, but this form does not seem to interfere materially, or very dangerously, either with the pregnancy or labour—the disease running its own usual course. In more than one case I have seen the patient gradually but imperfectly recover the use of the palsied limbs after delivery. In another no improvement occurred.

ALBUMINURIA IN PUERPERAL AND INFANTILE CONVULSIONS AND IN PUERPERAL AMAUROSIS, ETC.[1]

Above fifty years ago, Hamilton[2] and Demanet[3] first stated the important fact, that puerperal convulsions were liable to be preceded by symptoms of anasarca in the pregnant mother. The truth of this remark has been subsequently confirmed, in incidental observa-

[1] See *Edinburgh Monthly Journal of Medical Science*, October 1852, p. 369.

[2] Duncan's *Annals of Medicine* for 1800, vol. v. p. 313. "Where œdematous swellings of the lower extremities take place to a considerable extent in the latter months of pregnancy, in women of an unimpaired constitution, copious bloodletting alone prevents the occurrence of convulsions either before or during labour." See also his *Practical Observations*, p. 354. "The fits are preceded most frequently by lancinating pain of the head, sometimes by crampish pain of the stomach, and sometimes by œdematous swelling of the face and upper parts of the person."

[3] *Recueil Périodique de la Société de Médecine*, tom. ix., 1801-2, p. 110. He regards "l'anasarque comme une de leurs causes *essentielles*."

tions made by Dugès, Burns, Montgomery, Ingleby, Johns, and others. The special pathological nature, however, of the œdema or anasarca preceding and predisposing to puerperal eclampsia remained uninvestigated, nor was any direct morbid relation attempted to be traced between the dropsy and convulsions. Previously to my first course of lectures on midwifery in the University of Edinburgh in 1840-41, I had, in more than one case, ascertained the œdema or anasarca seen in patients affected with puerperal convulsions, to be one of the numerous and important forms of dropsical disease which Dr. Bright had shown to be connected with the existence of albumen in the urine. Up to 1843 I had detected, in repeated instances, this connection of puerperal convulsions with albuminuria, but hitherto I had found it only by examination of the urine during life. In the spring of 1843 I saw a fatal case of puerperal convulsions, in which, in addition to the detection of albuminuria during life, I had an opportunity of observing the usual granular disease of the kidney on post-mortem inspection.

Case I.—A woman, pregnant for the third time, and whose health had latterly been impaired, was seized with severe puerperal convulsions, in consequence, as her friends supposed, of strong mental excitement. I saw her, along with her medical attendant, about twelve hours after the convulsions began. She was at that time quite comatose in the intervals between the fits. In spite of venesection and various other measures of treatment, which were tried with the hope of relieving and rousing the patient, the convulsions continued, the coma deepened, the extremities became cold, the circulation began to fail, and the patient was evidently hopelessly moribund. The child's heart, however, still continued to beat, as was ascertained from time to time by the stethoscope ; and the principal indication left was the preservation, if possible, of its life. The os uteri had, from the imperfect labour which had supervened from the attack of the convulsions, opened to about the diameter of a shilling, but its structures were rigid. In order to extract the child, I followed the plan of turning recommended by Dr. Hamilton, and with far more facility than I anticipated *a priori*—viz. I tilted and pushed upwards and aside the presenting head with two fingers of the right hand introduced per vaginam, while, at the same time, by manipulating upon the child with the left hand through the abdominal and uterine parietes, a lower limb was at last brought near the opening of the os uteri, and seized. The relaxed state of the uterus and adjoining parts, resulting from the deep coma of the patient, no doubt greatly facilitated this version. On attempting to drag the body of the child through the os uteri, by pulling at the extended limb, I found the rigid structures of the undilated cervix to resist altogether the passage of the trunk. Under these circumstances, I made two slight incisions into the cervix, one on each side ; and on the re-application of extractive force, the breech now passed the yielding os uteri, and the birth of the child was readily effected. The child was born alive, and it survived and throve well. The placenta escaped without any hemorrhage. The mother died in the course of two or three hours after the birth of the child. A post-mortem examination of her body was made by Professor Bennett. The lateral incisions into the lips of the undilated os, and the

laceration or fissuring accompanying these incisions, were found not to extend beyond the duplicature of tissue forming the vaginal portion or projection of the cervix uteri; and had not been followed by any hemorrhage. There was no blood, fluid or coagulated, in the cavity of the uterus or vagina, or around the incisions. The kidneys presented a well-marked specimen of granular degeneration, probably of some standing.

In allusion to the preceding instance (see p. 295) I stated in the *Monthly Journal* for 1843, that this case "offered me the first opportunity of confirming, by inspection after death, an opinion that I had been led to adopt from the examination of the symptoms during life, and had publicly taught for the two last sessions—viz. that patients attacked with puerperal convulsions had almost invariably albuminous urine, and some accompanying, or rather preceding dropsical complication, and hence probably granular renal disease."[1]

My friend Dr. Lever of London, who happened also to be directing his attention at the same time to the connection of puerperal convulsions with albuminuria, published in the last number of *Guy's Hospital Reports* for 1843, several cases of puerperal eclampsia, in five of which he had found the urine to be albuminous; and to these cases he appended some excellent remarks on the probable relations between those two morbid states. Of late years, the same subject has been investigated, and the connection between albuminuria and puerperal eclampsia more or less elaborately traced and discussed by various continental authors, particularly by Cahen and Bouchut, Rayer, Devilliers and Regnauld, Depaul, Caseaux, etc.

Since the above date (1843), I have seen a variety of cases of puerperal convulsions in consultation and hospital practice, and have always (with very rare exceptions indeed) detected the existence of albuminuria in the urine of the mother. In one or two instances I have found the kidneys presenting traces of recent acute inflammation; as pus, etc. Sometimes, as in the case detailed above, convulsions, or symptoms threatening them, recur in successive labours in the same mothers in connection with established granular disease. Usually, however, the state of albuminuria, which leads to puerperal convulsions, is a transitory morbid condition, from which the patient recovers within the course of a few days after delivery; and the affection does not depend upon, or result in, any actual change of structure in the kidney. And it may be that the premonitory œdema, headaches, etc., and the actual convulsions themselves, do not stand in the relation of effect to albuminuria or

[1] *Monthly Journal of Medical Science*, November 1843, p. 1015.

renal disease as a cause, but that all of these circumstances—the dropsy, the convulsions, and the albuminuria—are simultaneous or successive effects of some one common central cause—viz. a pathological state of the blood, to the occurrence of which pregnancy in some way peculiarly predisposes, probably from various acts of secretion, nutrition, and depuration being vastly increased and altered by the conditions of utero-gestation. Occasionally, however, the state of albuminuria, when once induced, will continue for several weeks after delivery. Some time ago I attended, with Dr. Fairbairn, a case that was peculiar in this respect, as well as from the lateness of the occurrence of fatal convulsions.

Case II.—The lady had been confined in the country without any symptoms of eclampsia. She came to Edinburgh about seven weeks after her accouchement. When Dr. Fairbairn and I then saw her together, her particularly leuco-phlegmatic colour, some lesions of the senses, her occasional fits of stupor and want of memory, and the other undefined symptoms of which she was complaining, led me to suggest the propriety of testing the urine, in order to ascertain if it contained albumen. It was found highly albuminous. In the course of eight or ten days subsequently, our patient was suddenly seized with convulsions, followed by coma, under a repetition of which she soon expired. No case has, so far as I know, been put on record, in which eclampsia supervened so very late after delivery.

In the instance just now referred to, the albuminuria was, there was reason to believe, present before the termination of the patient's pregnancy; but did not lead to any attack of convulsions during, or immediately after, labour. And I have now seen a number of such instances in which the urine was albuminous during the last days or weeks of pregnancy, without convulsions, or any other special morbid phenomena, supervening in connection with labour.

In several of these instances, temporary, and in one or two, more permanent, amaurosis supervened at the time of delivery; accompanied in most, but not in all, with intense headache.[1] During the course of the present year I saw one such case of puerperal amaurosis in connection with albuminuria, in a patient at the sixth month of pregnancy; and the albuminuria in this, as in some other cases, tended to bring on premature labour.

[1] Drs. Bright and Barlow observed amaurosis in four instances of albuminuria; but these cases were not connected with pregnancy. M. Landouzy states, that he has seen thirteen cases of weakness of vision commence, cease, and re-appear with albuminuria, and without any appreciable change in the eye or its appendages. And he considers some degree of amaurosis as a common complication with albuminuria.—See *Archives Générales de Médecine* for November 1849, p. 370. Hamilton and other authors incidentally mention amaurosis as a symptom con-

Case III.—It was the patient's second pregnancy. Her face had looked swelled for a day or two previously. During the night she complained of intense headache. In the morning she complained of such a degree of blindness, that she could not distinctly see objects and persons. The urine was highly albuminous. She was freely bled. True labour pains supervened early in the forenoon. She was placed under the influence of chloroform for some hours, and delivered of a premature child, which was alive, but did not survive. The amaurosis in a great measure disappeared after the bleeding, and the patient's recovery after delivery was speedy and perfect, the albuminuria passing off within a week subsequent to her confinement.

Lately I have visited, with Mr. Sidey, an interesting case of more permanent amaurosis connected with the puerperal state and chronic albuminuria :—

Case IV.—The patient, now aged 36, is the mother of six children. In 1847, two days after the birth of her fifth child, she became totally blind in the course of a single night, the amaurosis being found complete when daylight came on. The blindness, however, gradually and entirely passed off in a few days. During the second week following the birth of her last child in July 1850, she again became suddenly and completely blind, with some accompanying symptoms of stupor, and a very slow pulse. The amaurosis has not, however, altogether disappeared on this occasion as after the former attack. The patient's vision is still (September 1851) so imperfect that she cannot read ; her memory is extremely defective ; she often forgets the proper word to use in the middle of a sentence ; the iris now contracts, but for some time was dilated and immobile. The last child died of convulsions about a week after birth. Mr. Sidey discovered the urine to be highly albuminous upon her first attack of amaurosis, and has found this state continuing in repeated examinations of it from that time to the present.

Four years ago, I met with the following instance of the complication in question :—

Case V.—A patient who was to be under my care at her confinement, sent for me several weeks before her expected time, to tell me that her vision had become so imperfect, that she found she could not distinctly see the trees before her window. There was no other special symptom present ; but this degree of amaurosis led me to examine the urine, which I found to be highly albuminous. During the few succeeding weeks, the amaurosis increased, and in addition, symptoms of hemiplegia slowly and gradually came on. Convulsions did not supervene, as I feared they would, during the labour, which was somewhat premature. The child survived. After delivery, the mother recovered greatly but not entirely, from the nervous lesions, and is still suffering under a slight degree of hemiplegia.

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nected with cases of convulsions. Dr. Ingleby has published a case in which a patient was affected with common puerperal convulsions in her first pregnancy ; and in a subsequent accouchement was attacked with complete amaurosis, which continued during the whole period of her labour. Vision was gradually restored. —See his *Facts and Cases in Obstetric Medicine*, p. 53.

Other lesions of the nervous system may present themselves under the same circumstances. Some of these lesions I have already noticed elsewhere. In fact, writers upon midwifery have long stated to us as premonitory symptoms of puerperal convulsions, various lesions of the nervous system, as headache, giddiness, derangements of sight and hearing, etc., and have told us, that when more or fewer of these symptoms make their appearance, an attack of convulsions is to be feared in connection with labour, but does not always supervene. These so-called premonitory symptoms of convulsions, however, are only in fact so many symptoms of acute albuminuria. They are indicative of the future probability of puerperal eclampsia, inasmuch as they are indicative of the actual presence of albuminuria. And, consequently, whenever they do present themselves, their existence should lead us to examine accurately into the state of the urine, assured that, if they are found to be connected with albuminuria, we may be certain of the liability of our patient to the supervention of convulsions—a liability that, no doubt, may be often lessened or averted by proper antiphlogistic treatment before labour, and by using such means as excite and act freely upon the intestinal, renal, and cutaneous secretions.

A few weeks ago, I saw an instance in which convulsions in a child after birth were connected with the presence of albuminuria in its urine—or connected, as it should be perhaps more correctly stated, with that condition of blood-poisoning or uræmia, which is the result of albuminuria—whether that condition consists in a morbid accumulation of urea; or is produced, as Frerichs [1] supposes, by the presence of carbonate of ammonia in the blood, produced by decomposition of the urea; or is, as is more probable, the effect of some other morbific agent in the circulating system, capable, like strychnia, of increasing the centric irritability or polarity of the spinal system to such an excessive degree that, under this super-excitability, comparatively slight eccentric causes of irritation in the stomach, intestines, uterus, bladder, etc. etc., readily

[1] If the blood-poison, which in albuminuria produces convulsions and coma, be, as Frerichs believes, carbonate of ammonia resulting from decomposition of urea, can we account for the power of chloroform in restraining and arresting, as it does, puerperal convulsions, upon the ground of its preventing this decomposition? The inhalation of chloroform produces, as various chemists have shown, a temporary diabetes; sugar appears in the urine, and hence probably also in the blood. The addition of a little sugar to urine *out* of the body, prevents, for a time, the common decomposition of its urea into carbonate of ammonia.

induce convulsive attacks of a general form, like those of puerperal eclampsia.

Case VI.—A lady, pregnant for the first time, was suddenly, when near the full period of utero-gestation, attacked, when rising in the morning, with a severe headache, faintness, and threatening of convulsions. My friend Dr. Weir, under whose professional charge she was, saw her immediately, and bled her largely at the arm, etc. On making a second visit about three hours subsequently, she took, when he was present, a most severe fit of convulsions, which left her in a state of deep coma. Two hours afterwards I saw the patient with him. She was still comatose, and remained so for some hours subsequently. The child's heart, when examined by Dr. Weir and myself, with the stethoscope, and while the mother was still comatose, had only 88 beats in the minute ; but in the evening it had risen to its usual rate of 130. Next afternoon labour supervened ; the patient was put under the influence of chloroform for some hours ; and a living child was born without any recurrence of the puerperal convulsions. The mother made a slow but perfect recovery. On the third day after birth, the child began to suffer under a succession of convulsive attacks, which gradually increased in severity during the next twenty-four hours, when it was placed for a considerable time under the influence of chloroform-inhalation, and the fits ceased. After the convulsive attacks supervened in the child, Dr. Weir and I had two opportunities of examining its urine ; and on both occasions we found the renal secretion of the infant, like that of the mother, highly albuminous. Some time subsequently, the infant died of inflammation of the cellular tissue of the loins and pelvis. We were not permitted an inspection of the body.

I am not aware that any one has hitherto observed albuminuria co-existing with infantile convulsions ; but future observation may perhaps show it to be a common pathological condition in some forms of that disease ; and probably in the Trismus Nascentium. In such cases, indeed, the urine has hitherto seldom or never been examined, in consequence of the trouble and difficulty connected with obtaining specimens of it in the affections of infancy. Albuminuria may yet be found to play also an important part in other diseases of infancy. The induration of the cellular tissue, or skin-bound disease (Sclérème—"*L'Endurcissement ou l'Œdeme du Tissu Cellulaire*" of French authors) is an extremely rare affection in Edinburgh. I have only seen two cases of it ; and, as was stated in the *Monthly Journal of Medical Science* for 1843, page 699, in both of these instances the urine was coagulable. Hence, at that time, I ventured to suggest, that the skin-bound disease itself, or at least some forms of sclerema, may be a variety or effect of Bright's disease in early infancy ; the effusion into the cellular tissue, which constitutes the marked feature of the affection, being so far analogous to the anasarca occurring with albuminous nephritis. For the solution of this point, affirmatively or negatively, we can only look to some

of those Continental pathologists who have ample opportunities of studying the disease in question.

ON MORBID CONDITIONS AND INJURIES OF THE SPLEEN IN THE PREGNANT AND PARTURIENT STATES.[1]

Sir J. Y. Simpson referred to three cases of fatal rupture of the spleen which had occurred respectively in the pregnant, parturient, and puerperal states. He pointed out the circumstance that, during pregnancy, there is often, if not generally, an increase of the white particles of the blood,—or, in other words, a kind of normal or physiological leucocythemia. As in states of morbid leucocythemia, the spleen was often enlarged, so was it also occasionally in pregnancy. Perhaps it would be found in practice much more common than the silence of authors on the subject might lead medical men to suppose. It sometimes recurred in successive pregnancies. In one patient of his, the spleen became enlarged to a very marked degree in a series of successive pregnancies, and this splenic enlargement disappeared always after delivery. Her youngest child is now about ten years old, and during that time there has been no recurrence of the splenic hypertrophy in the mother. A certain amount of softening very frequently accompanies the hypertrophy of the spleen, and predisposes to the laceration of the organ under strong exertion and muscular effort, blows, etc. The first case of rupture of the spleen in a child-bearing mother which he saw was a patient of Dr. Husband's. She began to show symptoms of fatal sinking shortly after premature labour set in, about the sixth or seventh month. On opening the body after death, the enlarged spleen was found lacerated, with effusion of blood into the peritoneal cavity. Shortly afterwards, a patient of Dr. Wilson's, who had been delivered a week or two before, after making some unusual muscular exertion, complained of abdominal pain and sinking, and died. Rupture of the spleen and effusion of blood were found on dissection. The late Dr. Cunningham of Currie delivered a patient in Edinburgh, using the forceps. He left very shortly afterwards to catch the railway train. The patient sank and died within an hour

[1] See Proceedings of Edinburgh Obstetrical Society, June 27, 1866, in *Edinburgh Medical Journal*, September 1866, p. 268.

or two. An inspection of the body was ordered by the law authorities, when rupture of the spleen and consequent effusion of blood were found to be the immediate cause of death.

FATAL PERITONITIS AND PERICARDITIS DURING LABOUR.[1]

Professor Simpson showed a preparation of the lower segment of a gravid uterus, with a portion of the placenta still in apposition with the inner surface. The preparation had been taken from the body of a patient who had arrived at the full term of utero-gestation, and who died some hours after the commencement of labour, very suddenly, and without having presented any symptoms that could afford a clue to the cause of death. She had on one or two occasions had a slight escape of blood, but was moving about and seemed to be in the enjoyment of good health until Saturday, May 4th, when she had a shivering fit, and began to complain of pain whenever she moved. As she had come to her full term, and pains were recurring from time to time, a midwife was summoned in the evening, who remained in attendance during the night. The pains having continued for several hours, and no advance of the labour having appeared to take place, Dr. Finlay, her usual medical attendant, was sent for about 5 A.M. of the 5th. Dr. Finlay had found that she was fairly in labour, and that the os, though but little relaxed, was sufficiently dilated to enable him to ascertain that the breech was the presenting part. There seemed to be no particular necessity for his continued attendance; so he went home, intending to return about 8 o'clock, and leaving instructions with the nurse, who was a very experienced accoucheuse, to send for him sooner if she should see fit. He had not got back till 9 o'clock; and on arriving then at the patient's house, he had been told that the woman had suddenly died a few minutes previously. On laying open the abdominal cavity, they had found it filled with a quantity of serous fluid; in which some fibrinous flocculi were floating; the intestines were loosely gummed together, and were covered at parts with inflammatory deposits; similar purulent patches were scattered over the surfaces of the liver and spleen, and on several portions of the uterus,—more particularly at the parts where the ovaries and Fallopian tubes were in apposition with its surface. Since he had referred to the ovaries

[1] See Proceedings of Edinburgh Obstetrical Society, May 8, 1861, in *Edinburgh Medical Journal*, May 1862, p. 1083.

and Fallopian tubes, he (Dr. S.) might be allowed to make a remark as to the relation of these organs and of the broad ligaments to the gravid uterus. He had always believed, and had been in the habit of teaching his class, that, during the increase in size of the impregnated uterus, the broad ligaments underwent but little change besides that of enlargement, and, in particular, that they never became split up in any degree, so as to contribute to the peritoneal investment of the enlarging organ. But the relation of parts in this case had convinced him, that that doctrine was, to say the least, not universally true, for the layers of the broad ligaments on each side had been found to be so far split up and separated, and so spread out over the surface of the enlarged uterus, that the Fallopian tubes, up to their fimbriated extremities, came to be almost in contact with the outermost layer of its muscular coat; while the ovaries were lying about an inch or an inch and a half farther back, along the surface of the uterus, and attached to it by an extremely short pedicle. The fimbriated extremities of both Fallopian tubes were very highly congested, and covered and surrounded with inflammatory deposits; the ovaries presented the same external appearances, were greatly enlarged, and were found on section to be soft and pulpy; the right contained a large corpus luteum. On cutting through the uterine parietes, their substance was found to be unusually soft and friable, giving way before the slightest touch. The fœtus was found with the breech presenting, the sacrum looking forwards to the left acetabulum, and the fœtal pelvis so tightly jammed down through the maternal brim, that some degree of force was required to dislodge it from its position. No local cause for the peritonitis could anywhere be discovered; nor was it possible to recognise any particular spot as that in which it had probably commenced. The only local lesion, independently of the results of the inflammatory action, that was found, consisted in a slight laceration of the muscular coats of the uterus on its inner aspect, at the level of the os internum, in front and towards the right side; corresponding to this lesion on the interior of the uterus there was a slight effusion of blood beneath the peritoneum; but there was no inflammatory deposit on the surface of the peritoneum at that point, and no evidence of any kind that the general peritonitis had there arisen, and thence extended over all the abdominal cavity; and in all probability the laceration of the uterus had rather been the result of the inflammatory changes in its texture than the primary cause of the wide-spread inflammatory action. The lower portion of the placenta was found to have been

separated from the interior of the uterus to some extent; and this had doubtless been the source of the occasional hemorrhage that had occurred before and during labour. That the peritonitis was of idiopathic origin seemed to be indicated by the circumstance, that the pericardium was found also to be the seat of some inflammatory changes; for its cavity was found distended with serum, and there were some small fibrinous deposits on the base of the heart and at the root of the large blood-vessels.

Dr. Simpson was not aware that there was any such case upon record of a patient dying of acute peritonitis during parturition, with the exception of one related by Dr. Clarke, regarding which Dr. Hamilton used to aver that they must have examined the body of the wrong patient in the dissecting-room. He (Dr. S.) had once before seen a somewhat similar case along with Dr. Graham Weir a number of years before. The lady was well enough to have been out shopping the day before her labour came on; she died immediately after the labour was terminated, and the cause of death was found to have been idiopathic pericarditis.

ON THE SEX OF THE CHILD
AS A CAUSE OF DIFFICULTY AND DANGER IN HUMAN PARTURITION.[1]

My object in the following observations is to show, that the Sex of the child has a very marked and demonstrable influence upon the difficulties and dangers of human parturition, in relation to the fate both of the mother and of the infant.

Two winters ago I had occasion to undertake some investigations into the causes of the difficulties attendant upon parturition in the white, as compared with the black tribes of mankind; and in the human female, as compared with the female of the lower animals. In consequence of these investigations I was led to conclude that the adaptation of the head of the fœtus to the maternal canals is so very close and accurate in the process of parturition, as it occurs in the female of our own race, that deviations of a very slight degree in the relative size of the cranium of the child, and of the pelvic passages of the mother, should, when viewed on the large scale, lead to differences of a very appreciable and notable extent in the relative safety or danger of the whole process.

[1] See *Edinburgh Medical and Surgical Journal*, October 1844, p. 387.

On further considering the subject, it appeared to me, that in the slight difference which is known to exist between the size of the heads of the male and female child at birth—and in the effects which this difference might or might not be traced to produce upon the results of parturition—a criterion existed by which the truth of the opinion in question might be fully tested. It was at the same time manifest that the subject was one of such a nature that the only evidence by which it could be settled obviously consisted of an appeal to an extensive body of statistical facts. The first difficulty was that of obtaining these required data. The numerous and excellent reports of instances of morbid and instrumental labour published by various authors are, however valuable in other respects, totally useless in regard to the present subject—in consequence of the sex of the child being rarely or never mentioned by them in the details which they give of their individual cases. The only exception to this general remark that I am acquainted with is to be found in the admirable *Practical Treatise* of Dr. Collins.[1] In his invaluable record of the morbid cases which occurred in the Dublin Lying-in Hospital during his Mastership,[2] Dr. Collins gives, at the end of the different chapters that treat of the individual difficulties and complications attendant upon labour, a table showing, amongst other items, the *sex* of the infant in each case. Dr. Collins himself properly suggests, that "an extensive record" of the kind which he has published might "materially assist the physician in obscure investigations."[3] For the data forming the grounds of the following calculations I am, as will be seen in the sequel, principally indebted to the facts recorded in Dr. Collins' work; and while the inferences I am about to draw form one instance of the fulfilment of his own suggestion regarding the utility of such data as he has collected, my deductions will, I doubt not, be regarded as the more valuable and trustworthy, seeing that the facts on which they are chiefly founded, were originally collected and published by Dr. Collins, without apparently any view whatever to the special inquiry upon which we propose to enter.

Having made these preliminary remarks, I shall now proceed to

[1] "*A Practical Treatise of Midwifery*, containing the result of 16,654 births occurring in the Dublin Hospital, during a period of seven years, commencing November 1826." London, 1836.

[2] "*Master* is the title of the physician to whose care this hospital is entrusted for a period not exceeding seven years."—See Dr. Collins' preface.

[3] *Ibid.* p. 1.

show that the sex of the child exerts a manifest influence upon the general maternal mortality accompanying human parturition, upon the frequency and fatality of its individual morbid complications, and upon the safety and life of the infant itself, both during birth and for some time subsequently to it. In all of these respects the birth of male children is attended with much greater danger than the birth of females. In proof of this, I have to adduce different series of corroborative details. These details will probably be exhibited with the greatest clearness, in the form of such a series of propositions as the data which I have to bring forward may seem to warrant. And I may further arrange these propositions into more general heads or chapters, so as to show the effect, during parturition, of the sex of the child as bearing—1. Upon the safety and life of the mother; and, 2. Upon the life and safety of the infant itself; 3. I shall enter into some investigations with the view of developing the cause of the greater comparative dangers accompanying the birth of male children; and, *lastly*, I shall allude to some practical inferences, and attempt to point out the extent to which the mortality in childbirth and early infancy is influenced by the mere sex of the offspring.

THE DANGERS AND DIFFICULTIES OF PARTURITION ARE GREATER TO THE MOTHER IN MALE THAN IN FEMALE BIRTHS.

The greater danger and difficulties which the mother incurs in connection with male births may be demonstrated both by an appeal to the general mortality among parturient mothers, and by a reference to the sex of the infant in a variety of the most formidable complications that are found to accompany the process of labour.

One or two propositions, and the statistical proofs on which they are founded, will illustrate this remark.

FIRST PROPOSITION.

Of the mothers that die under parturition and its immediate consequences, a much greater proportion have given birth to male than female children.

During Dr. Collins' term of mastership, 16,414 women were delivered in the Dublin Lying-in Hospital. Of these, 164 died. Of the 164 that died, 7 had been delivered of twins, and 157 of single children. In searching for the effect of the sex of the infants in relation to the maternal mortality, I shall on this, as on other

occasions in the following remarks, reject from the calculations the twin cases, because the plurality of the offspring is an element that would obviously disturb and pervert, in different ways, the accuracy of any investigations like the present; for the fœtuses, in compound births, are frequently of opposite sexes—they are in general considerably below the average size and weight—and the expulsion of the second of them, when once the maternal canals are dilated, is not attended with such obstacles, nor hence with such danger, as the passage of the first or the transit of a single child. If we confine, then, our attention to the 157 cases in which the mothers died in connection with the birth of a single child, we will find that in 3 the sex of the infant was not noted; in 105 it was male; and in 49 female. The number of maternal deaths was therefore much higher after male than after female births. But, to show with more clearness and precision the relative excess of mothers that died after giving birth to male, as compared with those that died after giving birth to female children, I shall, on this as on other occasions throughout the present essay, compute the casualties connected with female births as equal to 100, and calculate the proportion of those connected with male births in reference to this fixed standard. In this manner the absolute numbers and relative proportion of maternal deaths, after male and female births, contained in Dr. Collins' returns, would, according to the above data, stand as follows:—

Total maternal deaths.	In these the sex of child.		Or in proportion of male to female as
	Male.	Female.	
154	105	49	214 to 100

It is proper further to remark, that 38 out of the 157 cases appear to have died from "causes not the result of childbirth." I have not been able, from the details given by Dr. Collins, to separate these 38 cases from the general number; but if they were so subtracted, the remaining 119 cases would not improbably show a greater proportion of male births in connection with those maternal deaths that thus directly resulted from parturition or its immediate effects.

SECOND PROPOSITION.

Among labours presenting morbid complications and difficulties, the child is much oftener male than female.

This proposition may be proved by a reference to many of the

more formidable accidents that are found to accompany labour, as convulsions, laceration of the uterus, post-partum hemorrhage, instrumental cases, etc.

Convulsions.—Of 28[1] cases of convulsions described by Dr. Collins, in 17 the offspring was male and in 11 female; of the male children, 8 were still-born; of the female, 4.

Rupture of the Uterus.—This formidable accident occurred in 34 instances during Dr. Collins' mastership. In 23 cases the rupture was in connection with the birth of male children, and in 11, or in less than the third of the whole, it occurred in connection with the birth of female children.[2]

Puerperal Fever.—From November 1826 to November 1833, 88 patients were attacked with puerperal fever in the Dublin Lying-in Hospital. Among these 88 women, 54, or five-eighths, had given birth to male, and 34, or three-eighths, to female children.

Post-Partum Hemorrhage.—This complication is known to occur especially after those confinements in which the contractile powers of the uterus have been unusually taxed and exhausted during the previous stages of the labour. Dr. Collins reports 44 cases of hemorrhage after the expulsion of the placenta. In 31 of these the child was of the male, and in 13, or less than one-third, it was of the female sex.

Tedious and Difficult Labours.—The duration of the labour was noted by Dr. Collins in 15,580 cases. In 264 of these cases the process was prolonged beyond 24 hours. Dr. Collins has not, in his chapter on tedious labours, published the particulars of all these 264 instances, nor given such data as to enable us to ascertain the sex of the children in them. These data would, in all probability, have shown a great over-proportion of male infants—more especially in that class of instances in which the delay was produced by protraction of the second stage of labour, in consequence of want of proper relative size between the fœtal head and the maternal passages.

In another part of his work, Dr. Collins details a set of facts that may in a great measure fill up the deficiency to which we allude. In his chapter on "Still-born Children" he notes a variety of important circumstances, relative to 1121 cases in which the child was

[1] Here, as in most other cases, our calculations include only, as already stated, the results of uniparous births.

[2] Dr. Collins adduces 20 cases of rupture of the uterus mentioned by Dr. M'Keever, and out of these, in 15 the child was male, and female in the remaining 5, or in about one-fourth of the whole.

dead at birth. He further observes,[1] "In 106 of the 1121, the labour was extremely severe, and in nearly half of these the patients had been *one, two, three,* days ill, or even more, before admission into the hospital, and most of them grossly mismanaged." He gives a short outline of 49 of the 106 cases of tedious labour in the General Table on Still-born Children, and marks out by asterisks 60 additional instances, which were, to use his own words, "similar in most respects to those detailed."[2] These two sets of cases of protracted labour with death of the infant, amount in all to 109 instead of 106.[3] Out of this number the sex of the child was male in 65, and female in 44.

Forceps Cases.—The forceps were used in 24 cases during Dr. Collins' mastership. Of the children thus delivered, 16 were males, and 8 females.[4]

Crotchet Cases.—"Of the 16,654 births which occurred in the hospital, in 79," says Dr. Collins,[5] "delivery was effected by lessening the head, on account of extreme difficulty in the labour, or where the child was dead and interference necessary for the patient's safety." In the section on Still-born Children, 41 of the 79 are recorded, and references given to other 33 of the cases.[6] Among these 74 crotchet cases that are thus noted, the offspring was male in 50, and female in the remaining 24 instances.

If we attempt to throw the proofs that we have collected of our present proposition under the seven preceding heads into a tabular form, and taking again, for the facility of comparison, the female births at the fixed standard of 100, calculate the proportion of males to them, we shall find the result to be as follows:—

Nature of Complication.	Total Cases.	No. Male Children.	No. Female Children.	Proportion of Males to Females as
Tedious Labours .	109	65	44	148 to 100
Convulsions . .	28	17	11	153 to 100
Puerperal Fever .	88	54	34	161 to 100
Rupture of Uterus .	34	23	11	207 to 100
Post-Partum Hemor.	44	31	13	240 to 100
Forceps Cases .	24	16	8	200 to 100
Crotchet Cases. .	74	50	24	208 to 100
Total . .	401	256	145	165 to 100

[1] *Practical Treatise*, p. 462. [2] *Ibid.* p. 485.

[3] In 97 of these 109 instances of tedious labour, the number of hours during which the patients were in labour is stated. Five were under 12 hours in labour; 14 were from 12 to 24 hours; 19 were from 24 to 36 hours; 27 from 36 to 48 hours; 21 from 48 to 60 hours; 10 from 60 to 72 hours; and 1 was 90 hours ill.

[4] *Practical Treatise*, pp. 11 and 15. [5] *Ibid.* p. 486. [6] *Ibid.* p. 487.

It is unnecessary to qualify the proof which the above table affords of the proposition that we have laid down, by venturing to offer any comments. It is proper, however, to add that here, as elsewhere throughout the calculations of the present essay, it should be held in recollection that about 6 per cent ought always to be deducted from the column of the male children, in consequence of there having occurred, in concurrence with an acknowledged law in human statistics, that proportion of male over female births during Dr. Collins' term of mastership in the Dublin Hospital. He noted 8548 male births, and 8068 female births, being in the proportion of 106 males to 100 females.

Whilst it is requisite to correct our arithmetical results and tables to this extent, it will, at the same time, at once be seen that the required deduction is so slight as not in any material degree to interfere with the essential evidence of our various propositions.

THE DANGERS AND ACCIDENTS FROM PARTURITION AND ITS RESULTS ARE GREATER TO THE CHILD IN MALE THAN IN FEMALE BIRTHS.

The increased danger to infantile life dependent upon the sex at birth, may be demonstrated by a reference to the sex of the children in those cases in which the mothers die from labour or its consequences. It may be proved still more strongly and easily, by an appeal simply to the sexes of those children that are dead at the moment of birth, without any regard to the fate of the mother, and by the consideration of the comparative number of accidents and deaths among male and female infants consequent upon delivery.

We proceed to illustrate each of these points in the form of two or three propositions and their proofs.

THIRD PROPOSITION.

Amongst the children of the mothers that die from labour or its consequences, a larger proportion of those that are still-born are male than female; and, on the contrary, of those that are born alive, a larger proportion are female than male.

This proposition may evidently be considered under two heads. In the first place, we shall show that a greater proportion of male than female children are found among those infants that were brought forth still-born, by mothers who themselves died from labour or its consequences.

During Dr. Collins' mastership there occurred, as we have formerly seen, 154 cases in which the mother died after the birth of single children. The 154 mothers produced 105 male and 49 female children.

The result of the mortality of these infants at birth, relatively to their sex, may be reduced to the following short tabular form :—

Total male births 105 ; of these, born dead 50, *or* 49 *per cent.*
Total female births 49 ; of these, born dead 16, *or* 34 *per cent.*

In the second place, we remark, that, of those children who were borne alive by mothers that died from labour or its consequences, a greater proportion were females than males.

Here we must again take into our calculation the number of mothers who died after uniparous births in connection with the absolute number of male and female children which they produced, when the result, as far as regards those children who were born alive, may be stated in the following form :—

Total male births 105 ; of these, born alive 55, *or* 52 *per cent.*
Total female births 49 ; of these, born alive 33, *or* 67 *per cent.*

The general proposition may be further proved and illustrated by throwing the results we have just given into one such common table as the following :—

Sex.	Total Number.	Of these, dead.	Of these, living.	Proportion of dead to living, as
Male . .	105	50	55	95 to 100
Female .	49	16	33	48 to 100

Or, to state it conversely :—

Sex.	Total Number.	Of these, living.	Of these, dead.	Proportion of living to dead, as
Male . .	105	55	50	110 to 100
Female .	49	33	16	206 to 100

We thus observe, that, amongst the children of mothers dying after uniparous labours, males are born *dead* in the ratio of 95 to 100 living, while with females the ratio amounts only to 48 dead to 100 living. But we find, on the other hand, under the same cir-

cumstances, that males are born *living* in the ratio of 110 to 100 dead, while among females the average amounts to the ratio of 206 to 100 dead.[1]

FOURTH PROPOSITION.

Of still-born children a larger proportion are male than female.

It has already been stated, that, including the whole births in the Dublin Hospital, the male children born were, to the female, in the ratio of 106 to 100. By extended statistical returns, a similar observation has been proved to hold good as a general law in human reproduction, at least among European females.[2] M. Bickes whose results are founded on seventy millions of observations, has shown the proportion of male births to female births to vary in European nations from 104 to 108 boys for every 100 girls.[3]

All writers on human statistics seem further to acknowledge, that, among still-born children, males occur in a much greater ratio than females. This ratio exceeds very considerably the normal disproportion between the sexes at birth, and is therefore not explicable by it.

The excess of male still-births, and the different degrees of it in different returns, may perhaps be exhibited most simply in the form of a table, such as we have used in speaking on this subject in our lectures, and which we here insert.

[1] It was not till after the preceding calculations and remarks had been written that I met with the following confirmatory statement in Dr. Clarke's able letters to Dr. Price.—(See *Philosophical Transactions* for 1786, p. 349.) Speaking of the maternal mortality in the Dublin Lying-in Hospital from 1757 to 1784, Dr. Clarke observes—"I found that of 214 women dead of single children, 50 were delivered of still-born males, and 15 of still-born females; 76 of living males, and 73 of living females." Hence, calculating upon these data of Dr. Clarke, it would appear that, during the above period, male children were born dead in the Dublin Hospital in the ratio of 66 to 100 living, while with female children the ratio amounted only to 20 dead to 100 living; and, on the other hand, the males were born living in the ratio of 152 to 100 dead, whilst the females were born living in the much higher ratio of 487 to 100 dead.

[2] For an exception among the free population residing at the Cape of Good Hope, see *Hawkins' Medical Statistics*, p. 51. It is not unworthy of remark, that among twin children, there seem to be more females than males born. In the *Edinburgh Medical and Surgical Journal* for January 1844, p. 113, I have reported the sexes of the children in 788 twin cases. Among these there were 756 males and 820 females, or the males were to the females in the proportion of 92 boys to 100 girls. See a future page of this volume.

[3] Die Bewegung der Bevölkerung mehrerer Europ. Staaten.

Locality.	Proportion among Still-born Children, of Males to Females.	Reporters.
In Amsterdam .	120 to 100	Lobatto.
Geneva . .	125 ... 100	Mallet.
Wurtemburg	127 ... 100	Riecke.
Prussia . .	135 ... 100	Hoffmann.
Halle . .	140 ... 100	Guete.
London . .	140 ... 100	Bland.
Berlin . .	142 ... 100	Süssmilch.

During Dr. Collins' superintendence of the Dublin Hospital, 1121 children were born dead. The number of males to females among these 1121 children stood as follows :—

Still-born Males.	Still-born Females.	Or in proportion of Males to Females, as
614	507	122 to 100

In Dr. Collins' reports, the over-proportion of still-born males, though strongly marked, is not so great as in some of the other returns we have quoted. We believe that probably the variation in this respect among the evidence adduced in the preceding table, may be partially explained by the supposition, that, in some of the returns, premature children, and perhaps in others those that were putrid at birth, have not been included. At all events, whenever these are omitted, the number of still-born males in proportion to females will be found to increase. In other words, if we limit our calculations to infants still-born at the full time, and if we consider only those that die during the process of labour, we shall find among them the ratio of males to females to be greatly higher than the average is among still-born children taken indiscriminately, and without reference to the time and cause of their death.

We shall devote our next proposition to the proof of this.

FIFTH PROPOSITION.

Of the children that die during the actual progress of parturition, the number of males is much greater than the number of females.

It will easily be seen that the data required in proof of this proposition are very difficult to be obtained. Indeed, they could only be accurately ascertained by a series of minute observations instituted through the medium of the stethescope. This has not yet been done, so far as we know, by any observer. From the want of such

evidence, we are under the necessity of approaching as nearly as possible the proper proof, by taking advantage of a mark entered in the elaborate tables of Dr. Collins. He has placed a note of "p" (signifying putrid) opposite to all those children that were born in that state. These "putrid" children had evidently all, or almost all,[1] died from causes that had operated during intra-uterine life, and before the commencement of parturition. We may, therefore, probably reject such infants from our present calculations, inasmuch as these calculations refer only to children dying *during* the continuance and progress of the parturient process. Of the 1121 children that were still-born, as many as 527 were found putrid at birth. The sexes of the remaining 594 stand in the relation shown by the following table :—

Still-born Children not putrid.	No. of Males.	No. of Females.	Proportion of Males to Females, as
594	357	237	151 to 100

In the general rate of infantile mortality at birth, we have already seen, under the previous proposition, that in Dr. Collins' cases the proportion amounted to about 122 males for every 100 females. In the present instance, and when the children that had died some time before labour began are excluded, the ratio rises as high as 150 boys to every 100 still-born girls, or as 3 to 2. We might further, from the 594, exclude 62 premature still-born children that were not putrid—viz. 37 males and 25 females, and retain only those that had reached the full time. This, however, would not alter our results above 1 in the column of 151 males.

But the ratio of these male still-births would probably have been made somewhat greater, and our present proposition still more strongly borne out, had we been able, on the one hand, to take into the calculation those children only who died subsequent to the commencement of the process of parturition, and to exclude, on the other hand, all those that perished, however shortly before, under the influence of other morbific agents than the effects of labour. The fact of the still-born children being "putrid," shows generally that death has occurred several days at least before birth. It is a condition

[1] For two remarkable exceptions, see Dr. Collins' *Treatise*, pp. 470 and 483, cases 461 and 1058. In a paper on Peritonitis in the Fœtus (*Edinburgh Medical and Surgical Journal*, October 1838, p. 390), I have attempted to show that a large number of those children that are still-born and putrid have died of peritoneal inflammation.

which has enabled us therefore to exclude most, but not all, of those who had died antecedently to the commencement of actual labour. I repeat, that if we had possessed the power of excluding all—and thus so far improving our data—the proportion of male to female children who died during labour, high as we have shown it to be, would, in all probability, have been found raised still higher.

SIXTH PROPOSITION.

Of those children that are born alive, more males than females are seen to suffer from the morbid states and injuries resulting from parturition.

Among the accidents and injuries to the child more immediately resulting from parturition, no one has, of late years, been made the subject of such minute pathological investigation as the "bloody tumour" or "ecchymosis" of the head—the *Cephalæmatoma neonatorum* of Naegele, Valleix, Dubois, Walshe, and various other modern authors. "The unequal pressure," says Velpeau, "which the cranium experiences, and the tendency that its bones have to over-ride one another, during most labours, when the head is traversing the pelvis, and whether the labour be natural or artificial, is incontestably the most common cause of this tumour."[1] No author, that I am acquainted with, has given any statistics regarding the sexes of the infants affected with cephalæmatomata, with the exception of Burchard. The data which he adduces are not so extensive as could be wished, but still they furnish strong and indubitable proof of our present position. In his essay, "De tumore cranii recens-natorum sanguineo," he mentions that out of 43 cases, which he had observed at the Breslau Hospital, the child was male in 34 and female in 9 of the instances, so that the relative frequency of the disease in the two sexes stood thus :—

Male Children.	Female Children.	Proportion of Males to Females.
34	9	377 to 100

I am not aware that there have been hitherto published such data regarding serous swellings of the infant's scalp, the *caput succedaneum* of the older authors, or the asphyxia or apoplexy of children at birth, or any of the other accidents to which they are

[1] *Traité Complet des Accouchemens*, tom. ii. p. 594.

subjected during labour, as would enable us to make similar calculations with respect to them. As they are all confessedly more or less direct results of the physical pressure which the infant's head suffers during parturition, the calculations derived from one would probably apply with greater or less force to each of the others. Since additional data from *individual* morbid states and injuries are thus wanting in support of the proposition we have laid down, we shall appeal, in confirmation of it, to some calculations we have made from Dr. Collins' data regarding the *general* mortality observed among children immediately after delivery. In his chapter on "Children dying in the Hospital," Dr. Collins observes, "thirty-two children born at the full period died a few minutes after birth; in six of these, respiration could not be established, though the heart's action continued for some time."[1] Dr. Collins does not offer any clue by which these 32 cases can be discovered in the table attached to this chapter, and thus their sexes ascertained. I find, however, in that table, that 17 single children, born at the full period, are marked as dying within the first half-hour after birth. They hence probably perished from morbid states the more immediate results of labour. Of the 17 children, 9 died within five minutes after birth; 1 in ten minutes; 4 in fifteen minutes; and 3 in thirty minutes. One of the 17 children was female, and 16 of them males. If we might venture to make the same form of calculation as we have hitherto used, of the respective sexes of the children from these very small and insufficient data, it would stand thus :—

Male Children.	Female Children.	Proportion of Males to Females as
16	1	1600 to 100

SEVENTH PROPOSITION.

More male than female children die in the earliest periods of infancy; and the disproportion between the mortality of the two sexes gradually diminishes from birth onwards till some time subsequently to it.

This proposition follows as almost a necessary corollary from those that have preceded it. If, in consequence of the pressure and greater injuries to which male children are subjected during birth, more male than female infants perish during labour; and if, again,

[1] *Practical Treatise*, p. 501.

among those born alive more males than females are found to suffer under such morbid states as are the immediate results of parturition, it might justly be *a priori* expected that the same causes which produced these results during delivery and immediately after it, would so far *continue* to affect the male constitution, for some time subsequently, as to predispose it more to disease, and likewise render the diseases which did occur in it more dangerous and fatal in their course than those that affect the female. Further, if this greater liability to morbid action, and its greater intensity and fatality in the male, as compared with the female infant, were the consequence of the male being subjected to greater physical injuries at the time of parturition, the pathological characteristics in question should be observed to diminish more and more in the male system from the moment of birth onwards, because the morbific effects, resulting from any cause or causes operating during birth, would thus progressively diminish, and ultimately pass away. At last, therefore, at some date in early infantile life, the mortality among male and female children, though very different at first, should become nearly or entirely equal. And such, indeed, is the actual state of facts, when the mortality during infancy is investigated upon a large scale. Thus in his observations regarding the "influence of sexes" upon mortality, Quetelet, in his elaborate *Treatise on Man*, remarks, as a matter of statistics, that among male as compared with female children, "the ratio of deaths before [during] birth is as 3 males to 2 females; during the first two months after birth the ratio is as 4 to 3; during the third, fourth, and fifth months as 5 to 4; and," he adds, "after the eighth or tenth month a difference scarcely exists."[1]

I shall endeavour to bring forward some statistical evidence in support of the preceding statements.

Dr. Collins has given in his *Treatise*,[2] a table containing a variety of particulars regarding 284 children that died in the Dublin Hospital within a few days after their birth. Excluding twins and premature children, the date of the death of 148 of these infants is noted in the table referred to. Six of them died on the 8th day after birth; two on the 9th; and one on the 10th. These nine included 5 boys and 4 girls. With regard to the remaining 139 infants that died during the first seven days after birth, the following table, which has been compiled with considerable care, will show

[1] *Treatise on Man*, Chambers' English edition, p. 50.

[2] Dr. Collins' *Treatise*, p. 519, etc.

the periods of their demise, and the relative proportion which the mortality among the male and female children presented at different dates during the first week of life.[1]

Period of Death.	Males.	Females.	Proportion of males to females.	Ratio of Excess of male mortality.
Within first half-hour .	16	1	1600 to 100	1500
Within first hour . .	19	2	950 to 100	850
Within first 6 hours .	29	7	414 to 100	314
Within first 12 hours .	34	15	226 to 100	126
Within first 18 hours .	36	19	191 to 100	91
Within first day . .	49	28	175 to 100	75
Within first week . .	80	59	136 to 100	36

The last column in the above table shows in the most striking manner both the great proportion of male over female deaths in the first few hours and days of extra-uterine existence, and the rapid diminution which takes place from the moment of birth onward in the relative superabundance of the male over the female mortality. The principal and strongest objection that may be urged against the table is the small number of data which is made in it the basis of such interesting statistical deductions. I have given it, however, such as it stands, in consequence of the want, so far as I know, of any more numerous or complete series of similar facts bearing upon the relative male and female mortality in the first week of life. Against the table which I have next to bring forward, the same objection cannot be urged, as the individual data are sufficiently ample, and yet the results are exactly the same in their nature, and equally confirmatory of the proposition we are discussing. For the data upon which I have constructed the table, I am indebted to an elaborate extract of deaths at different ages, contained in one of the invaluable reports of the Registrar-General of England. At pp. 144 and 145 of his Fifth Annual Report, the last published, are given, in two separate tables, the numbers, ages, and sexes of all the individuals that died in England and Wales in the year 1841. In that year 134,563 died who had not passed the age of five; namely, 71,595 males and 62,968 females. In the following table I have arranged these data regarding the male and female deaths, and made calculations from them of such a kind as bear upon the objects of our present proposition.

[1] The time the mothers remained in the institution, in most instances, was for "a period of eight, nine, or ten days after delivery."—Dr. Collins' *Treatise*, p. 500.

Total number and relative proportion of male and female deaths during the year 1841, *in England and Wales, within the first five years of life.*

Ages.	Males.	Females.	Proportion of males to females.	Ratio of Excess of male mortality.
0 to 1 month . .	13,351	9,741	137 to 100	37
1 to 2 months . .	4,858	3,703	131 to 100	31
2 to 3 months . .	3,313	2,676	124 to 100	24
3 to 6 months . .	8,008	6,451	122 to 100	22
6 to 9 months . .	6,341	5,182	110 to 100	10
9 to 12 months . .	5,573	5,013	105 to 100	5
1 to 2 years . .	13,987	13,281	100 to 100	0
[1]2 to 5 years . .	16,164	15,941	101 to 100	1

A different arrangement of the facts included in the preceding table may probably show still more strikingly the great proportionate male mortality in the period immediately following birth. During the second year of life—that is, from the twelfth to the twenty-fourth month—13,987 males and 13,281 females died, or nearly an equal number of the two sexes, the excess on the part of the males amounting only to about 700. During the first month of life—that is, from birth up to the twenty-ninth day following it—there died of male infants a number nearly similar to that of those who perished in the whole course of the second year, namely, 13,351. But the corresponding female mortality during the same period was very much less, amounting only to 9741. Whilst the difference, therefore, between the mortality of the two sexes, during the second year, did not, in the numbers given, show an excess of much more than 700 on the side of the males, this excess ran to upwards of 3500 during the single first month of life, or was five times greater in amount. A tabular arrangement of these figures will point out this contrast more plainly.

Deaths in England in 1841.	Of male children.	Of female children.	Excess of male mortality.
During first month of life . .	13,351	9,741	3610
During second year of life . .	13,987	13,281	700

[1] In England the proportion of living males and living females does not become equal till about the twentieth year of life. After that period, an excess of the living population is female; before it, a small excess of it is of the male sex, there being originally born 105 males for every 100 females.—*Fourth Report*, p. 12. Hence, other circumstances being equal, a slightly greater number of males than of females should necessarily be found in the mortality bills in early life, as seen in the last two lines of the table.—See the Registrar's *Fifth Report*, p. 23.

If it were necessary, and our space permitted, it would be easy to adduce additional tables, constructed from the Registrar's Returns of other years for England and Wales, and from the reports of the mortality in other countries, showing, in correspondence with our proposition, the two facts—1*st*, that the male mortality, as compared with the female, is much greater immediately after birth, and 2*d*, that the male excess of deaths gradually and regularly diminishes from that time onwards, to about the end of the first year of life. The only new and remarkable circumstance that would be proved by these additional tables is, that the rate of the decrease of the male mortality is everywhere nearly the same.

In illustration of this last remark, I shall content myself with giving the male as compared with the female infantile mortality in England during 1841, and in Western Flanders from 1827-30. The Flanders mortality is calculated upon a return of 37,203 deaths for the first five years of life, including 21,198 males and 16,005 females.[1]

Ages.	Male mortality in		Female mortality.
	England.	Flanders.	
0 to 1 month	137	139	100
1 to 2 months	131	128	100
2 to 3 ,,	124	126	100
3 to 6 ,,	122	122	100
[2]6 to 9 ,,	110	117	100
[2]9 to 12 ,,	105	104	100
1 to 2 years	100	103	100
2 to 5 ,,	101	99	100

CAUSES OF THE GREATER MATERNAL AND INFANTILE DANGER AND FATALITY ACCOMPANYING THE BIRTH OF MALE CHILDREN.

On this point Dr. Clarke, in his excellent "Observations on some Causes of the Excess of the Mortality of Males above that of Females," published in the *Philosophical Transactions* for 1786, justly

[1] See Quetelet on the *Natural History of Man*, p. 30. The town and country mortality are given separately by Quetelet. I have added both together, and computed the proportions in the table from their conjoined sums.

[2] The dates of the two original returns, from the 6th to the 12th month, do not precisely correspond. In the English tables the returns are from the 6th to the 9th month, and from the 9th to the 12th; in those of Flanders the corresponding returns here calculated upon are from the 6th to the 8th month (not the 9th), and from the 8th to the 12th. The 8th month is not given separately in the published returns, for if so, we should have been enabled to equalise the two exactly.

remarks that it may be safely asserted, "anatomy has not hitherto detected any internal difference between the animal economy of the male and female, which can be supposed to account for their difference of mortality, more especially in early infancy."[1] The same author then suggests two sets of causes in explanation of the higher mortality among male children—namely, *first*, their larger size and consequent more difficult delivery; and, *secondly*, their greater liability during their intra-uterine life to disease and debility, from their requiring, in consequence of their size, more actual nourishment from the mother than smaller female children stand in need of. We shall discuss this latter opinion before attempting to show the greater truth and correctness of the former one.

"As the stamina of the male are naturally," says Dr. Clarke, "constituted to grow of a greater size, a greater supply of nourishment in utero will be necessary to his growth than to that of the female. Defects in this particular (nourishment), proceeding from delicacy of constitution or diseases of the mother, must, of course, be more injurious to the male sex."[2]

"It appears beyond doubt," says Quetelet, "that there is a particular cause of mortality which attacks male children by preference, before and immediately after their birth." "It will be interesting," he further observes, "to investigate the causes of a circumstance which is so unfavourable to the male sex." "If," he continues, "we were desirous of guessing at this point, we might say with those who suppose that a male conception requires a certain excess of energy in the woman, that this excess of energy was absent or wanting during the growth of the fœtus, and, that energy failing, the child would suffer more from it if a boy than if a girl. Hence the disproportion of dead births between the sexes," etc.[3]

In a review of Dr. Collins' Treatise in the *Dublin Medical Journal*, Dr. Graves makes several remarks on the same subject. After showing that Quetelet and Caspar had found respectively in Flanders and Prussia the number of still-born males to still-born females to be 140 to 100, and that in Paris the ratio was 122 to 100, Dr. Graves adds, "In Dublin, Dr. Collins' numbers give the proportion very nearly the same as that of Paris, so that here we have the additional fact corroborative of those already brought forward, to prove that a *greater* mortality before birth prevails among males than

[1] *Philosophical Transactions*, vol. lxxvi. p. 352. [2] *Ibid.* p. 353.
[3] *Treatise on Man*, English edition, pp. 25 and 30.

females—a most curious result, well calculated to puzzle both physiologists and philosophers."[1]

I shall not attempt to solve, as Clarke and Quetelet have done, the problem broached by Dr. Graves, but will content myself with showing that the observations on which it is founded are in themselves erroneous, and that the tables of Dr. Collins, appealed to by Dr. Graves, prove, when studied minutely, that, contrary to the general opinion entertained on this point, a greater mortality does *not* prevail before birth among male than female infants. With this view, we bring forward the following as our

EIGHTH PROPOSITION.

Of the children that die in utero, and before the commencement of labour, as large a proportion are female as male.

I have already had occasion to state that, among the 1121 still-born children, so often already referred to as occurring during Dr. Collins' mastership, 527 were putrid, and hence had perished before the supervention of parturition.

If we contrast together the proportionate number of males and females among these 527 children, as well as the sexes of the infants among them that were born at the full time, but putrid, and the sexes of all those that were still-born prematurely, whether putrid or not, we shall find the result to be as follows :—

State of the Children.	Total Cases.	Male.	Female.	Proportion of Male to Female.
No. of still-born putrid children .	527	257	270	95 to 100
No. of still-born at full time and putrid	296	148	148	100 to 100
No. of premature still-births .	293	146	147	100 to 100

This table seems particularly valuable and instructive in one respect. It demonstrates satisfactorily, that the intra-uterine morbific agencies, whatever they may be, which act fatally on the fœtus before birth, act equally on the female as on the male child ; and that it is to other agencies than these that we are to look for the remarkable proportion of male over female deaths which is observable among still births.

In premature births the comparative compressibility and flexi-

[1] *Dublin Journal of Medical Science*, vol. viii. pp. 518-19.

bility of the bones of the cranium is so decidedly greater as to offer no such marked difference between the size and resistance of the male and female head, as we shall immediately see to exist at the full time. Now the last column of the table shows, that, in this class of still-births, the premature, the number of dead-born male and female children was exactly equal. The second column testifies, that the same fact holds true of children born at the full time, and in a state of putridity. Further, in looking to the evidence afforded by the first column, we may there observe, that of *all* the children that had perished from intra-uterine causes, and before the commencement of labour (as demonstrated by their putrid state), the females were even more numerous than the males.

The whole series of facts proves, contrary to what is generally alleged, that the proportion of male children that die *before* birth is not greater than the proportion of females. Indeed, if we deducted the usual 6 per cent for the normal over-proportion of males, the ratio of girls dying before parturition would be found to be greater than that of boys—a conclusion which the first column would seem to go far to corroborate and strengthen, for in that computation the number of the dead females distinctly and considerably exceeds that of the dead males.

This result, with regard to the equality of the sexes among putrid and premature still-born children, becomes only the more striking when we couple and contrast it with the fact which we have already brought out, that of the children who are still-born, and *not* putrid, as many as two out of every three are boys. In other words, among the infants that die *before* labour, the females are equal, if not greater, in number than the males. Among the infants that die *during* labour the males are raised to the high proportion of 150 boys for every 100 girls. For this sudden and surprising increase, during labour, of the male infantile mortality over the female, there must be some cause or causes traceable in the conditions of the process of parturition. Let us now see, in accordance with what we have already proposed, whether the cause or causes in question be not referable to the greater size of the male infant, and the effects of this size upon the compression of the cranium and its contents. And in order to understand more thoroughly the investigation, let us inquire, in the first place, into the actual average difference between the volume and weight of the male and female at birth.

RELATIVE WEIGHT AND SIZE OF THE MALE AND FEMALE AT BIRTH.

In the Dublin Hospital, Dr. Clarke long ago endeavoured to discover the relative weights of the new-born male and female child, by observations made upon 60 children of each sex. In his paper in the *Philosophical Transactions* of 1786, to which we have repeatedly referred, he gives both the absolute and average weights of these 60 male and 60 female infants.

The 60 males weighed in all 442 lbs.[1]

The 60 females weighed in all 404¼ lbs.

The average weight of the male was 7 lbs. 5 oz. 2 dr.

The average weight of the female was 6 lbs. 11 oz. 2 dr.

The average difference between the weight of the male and female child, as calculated from these 120 instances, thus amounted to about nine ounces.

In the Edinburgh Lying-in Hospital, 50 male and 50 female children, born during the latter months of 1842 and the earlier part of 1843, were weighed by my friend and assistant, Dr. Johnstone.

The 50 males weighed in all 383 lbs. 11 oz. 4 dr.

The 50 females weighed in all 342 lbs. 12 oz. 4 dr.

The average weight of the male was 7 lbs. 9 oz. 1 dr.

The average weight of the female was 6 lbs. 12 oz.

The difference between the weight of the male and female child, as calculated from these 100 cases, thus amounted to about ten ounces on the average.

The respective lengths of these 50 male and 50 female children were also carefully ascertained in the Edinburgh Hospital.

The total length of the 50 males was 1020½ inches.

The total length of the 50 females was 990½ inches.

The average length of the male child was 20 inches 5 lines.

The average length of the female child was 19 inches 10 lines.

The average difference between the length of the 50 males and 50 females thus amounted to 7 lines, or somewhat upwards of half-an-inch.

These results are sufficient to prove, that at birth, as at other subsequent periods of life, the male is usually of a greater weight and size than the female. The general volume, however, of the *body* of the child is not, in relation to the mechanism of parturition, a matter of such immediate importance as the size of the *head* itself,

[1] The Troy or Apothecaries' weight is there used.

the facility or difficulty of the process being principally dependent upon the relative size of the latter. The greater weight and volume of the male than the female child at birth might, *a priori*, entitle us to calculate that the head of the male would, in correspondence with the other parts of the body, be larger than the head of the female. In such an inquiry, however, as the present, it is better to refer to direct arithmetical facts than indirect though probable inferences, and Dr. Clarke has left us a series of measurements of the heads of male and female children, at birth, that are valuable in giving us more precise ideas upon this point. His observations were made upon the 120 male and female children whose respective weights we have already detailed. "For measuring their heads, I made use," he observes, "of a piece of painted or varnished linen tape, divided into inches, halves, and quarters. I took *first* the greatest circumference of the head, from the most prominent part of the occiput, around the frontal sinuses; and, secondly, the transverse dimensions, from the superior and anterior part of one ear across the fontanelle to a similar part of the other ear. These data appeared to me the most likely to afford data for determining the respective sizes of the brain in the different sexes." [1]

The result of Dr. Clarke's measurements may be exhibited in the following manner.[2]

	Absolute dimensions in 60 males.	60 females.	Average dimensions in 60 males.		60 females.	
	Inches.	Inches.	Inches.	Lines.	Inches.	Lines.
Circumference of head . . .	839	817	13	$11\frac{4}{5}$	13	$7\frac{2}{5}$
Dimensions from ear to ear . .	$445\frac{3}{4}$	$433\frac{1}{4}$	7	$5\frac{1}{7}$	7	$2\frac{3}{4}$

The differences brought out in the preceding table, between the male and female head, may appear more precise if we reduce them to decimal figures.

	Average circumference of head.	Average dimensions from ear to ear.
	Inches.	Inches.
In male child .	13.983	7.429
In female child .	13.617	7.221
Difference . .	0.366	0.208

[1] *Phil. Trans.* lxxvi. p. 358.

[2] Since these remarks were sent to press, I have incidentally met with the ollowing remark in Dr. Forbes's *Quarterly Medical Review*, vol. x. p. 492. "M.

According to these observations upon new-born children, it would appear that—

1. The head of the male infant, when measured across from ear to ear, over the fontanelle, is about $2\frac{5}{7}$ lines, or nearly two-eighths of an inch greater than that of the female.

2. In circumference, the head of the male is $4\frac{2}{5}$ lines, or almost precisely three-eighths of an inch greater than that of the female. Hence—

3. The *transverse* diameter of the male head is nearly one-eighth of an inch greater than the transverse diameter of the head of the female child.[1]

The preceding difference between the absolute size and weight of the male and of the female child at birth, and between the relative dimensions of the male and female infantile head, may appear to some to be on the whole so slight, as not to afford in themselves any sufficient explanation of the differences that we have seen to exist, between the dangers and mortality incident respectively to male and female births. The general greater size of the head and body of the boy at birth may not seem adequately to account, by any influence traceable to it alone, for the general greater peril and fatality accompanying the birth of male as compared with female children. The alleged cause may appear unequal to the production of the alleged effects. Let us state, therefore, the reasons that induce us to hold the contrary opinion, and which impress us with the belief that the difference between the size of the male and female head at birth, inconsiderable as it may seem, is the true cause of that greater danger and fatality to mother and child, which accompanies the birth of male infants.

Before doing so, it may be proper to premise, that under our fifth and eighth propositions I have already shown, on the one hand, that the explanation of the cause of the greater number of male than female still-born infants proposed by Clarke, Quetelet, etc., as de-

Nevermann gives us the results of the measurements of the heads of 384 children by Professor Thulstrup of Christiana, which fully bear out Dr. Clarke's statements."

[1] Calculating upon the accuracy of Dr. Clarke's linear measurements of the fœtal head, it would appear that the *surface* of the cranium of the male infant, *above* the circumferential line of measurement, is about 27.8 square inches; that of the female about 26.3 square inches. The arch of the male cranium, at birth, is therefore, superficially, upwards of one square inch greater than that of the female. To state it in other words, the proportion of the surface of the head of the male new-born child to that of the female is nearly as 19 to 18—or the surface of the head of the female is one-nineteenth part less than that of the male.

pending upon intra-uterine agencies, is totally incorrect, and disproved by statistical facts; and, on the other hand, we have seen that the increased mortality of children of the one sex over those of the other at the time of birth is a result of some circumstance or circumstances connected with, or at least only in operation during, the process of labour. Whilst this holds true as regards the child, it is of consequence, at the same time, to recollect that the complications and dangers on the part of the mother, which we have found so much more frequently attendant upon male than female births, are all of such a nature as to be confessedly the direct or indirect consequences of causes acting during parturition. Further, it will, we imagine, be granted by every accoucheur, that whatever circumstance or circumstances may, by operating as a cause of obstruction, lead to the greater danger and fatality of the male infant during the progress of labour, will, at the same time, in all probability, equally explain that greater peril and fatality to the mother during the process, which is incident to the birth of males.

For the solution of the present problem, both as regards the fate of the mother and of the infant, we believe that we ought to look alone to the greater size of the head of the male infant, and that for a variety of reasons which we shall now endeavour to state *seriatim*, adding such illustrative remarks and evidence as they may seem to require, and throwing the more important deductions, that may seem to flow from the statistical proofs brought forward, into the shape of additional propositions.

REASONS FOR CONSIDERING THE GREATER SIZE OF THE HEAD OF THE MALE CHILD AS THE CAUSE OF THE GREATER NUMBER OF COMPLICATIONS AND CASUALTIES ACCOMPANYING MALE BIRTHS.

We shall begin our enumeration of these reasons by stating that—

First, *For the very marked differences existing between the difficulties and perils of male as compared with female births, there is no other traceable cause in the mechanism of parturition than the larger size of the head of the male child.*

Parturition, at the completed term of pregnancy, is a process consisting of a combination of mechanism, intended for the extrusion of the full-grown infant from the cavity of the uterus. For the perfect action of this mechanism, three sets of physical conditions

are essentially necessary. *First*, A certain degree of mechanical expulsive power is required, and this is supplied principally by the vital contractions of the uterus. *Secondly*, An adequate degree of capacity and dilatation is necessary on the part of those maternal passages through which the child is to be expelled. *Thirdly*, The body which is to be expelled (viz. the infant) must be of such size, and be placed in such a position or positions, as to allow of its sufficiently easy entrance and progress through these maternal passages. A perfect and equitable adjustment between these three different conditions is necessary to the constitution of natural labour; and, on the other hand, a deviation—absolute or relative—in any one or more of these conditions, leads on to tedious and difficult parturition, and its results. In which of these three essential conditions could a deviation be possibly effected by the sex of the child, so as to account for the greater dangers and complications attendant upon male births?

The mere sex of the child, and the circumstance whether it was a male or female, could evidently produce no primary effect upon the vital muscular contractions of the uterus, so as to alter them in any morbid manner. Consequently, we may exclude from our consideration the first set of physical conditions that we have above named.

We may do equally the same with the second, because it is impossible to conceive that the measurements of the pelvis and maternal passages could be directly altered in any way by the child which has to pass through them being male rather than female.

In searching for a possible cause of deviation in the mechanism of parturition, explanatory of the facts which we have traced, we are thus, by a method of exclusion, compelled to look to the third set of physical conditions of labour, viz. the position and size of the infant.

The consideration of the position of the infant will afford us no clue to the problem, because in most of the cases from which we have drawn our data, the presentation and position were natural. When it was otherwise, the deviation was as frequently on the part of the female as of the male child.

The only item, therefore, that is left in which we may trace any distinction whatever between the mechanism of labour in male and in female births is the relatively greater size of the infant of the male sex, and this relatively greater size could only influence labour or its consequences in so far as it affected the dimensions of the *head*

of the child—the increased volume of its body never, unless when excessive in degree, retarding or complicating, to any extent, the progress of the labour in cases of cephalic presentations. The difference between the male and female infant's head is indeed slight, but we are forced, at this stage of the inquiry, to believe it to be the probable origin of the greater dangers and more numerous complications accompanying male births, simply in consequence of our being utterly unable to trace any other appreciable difference, or imagine any other possible circumstance, in the conditions of parturition, which could afford the most distant explanation of the series of phenomena that we are discussing. It is the only circumstance which we can detect as an apparent and constant antecedent to the consequences we have described; and hence seems to be that particular condition which we ought to look upon as the cause of these effects.

In the foregoing remarks we have arrived at the conclusion that has just been stated by a kind of reasoning by exclusion. The argument we have been considering is in a great measure negative. But others of a more positive character are not wanting in confirmation of the same view. For—

SECONDLY, *An increase in the effects may be shown to be connected with an increase in the alleged cause.*

"When," observes Dr. Hamilton, "the head of the infant is pushed foremost, and the labour is not completed within twenty-four hours from its actual commencement, the case is styled laborious, and it may terminate in one of three ways. Thus, the natural powers may at last complete the delivery; or, though these fail, it may be possible for the practitioner to complete the delivery by mechanical means, with safety both to mother and child; or it may be impossible to draw the infant alive through the natural passages. These *three* several terminations constitute *three different orders of laborious labours.*"[1]

Now, if it were granted us, for the sake of argument alone, that the greater obstacles and perils attendant upon male births are attributable to the larger size of the male infant's head, it would almost necessarily follow, that just in proportion as the difficulties

[1] *Outlines*, p. 45. "It is," says Dr. Churchill, "peculiar to midwifery operations (and the same remark applies equally to the different orders of laborious labours), that they form an ascending series, increasing in gravity from the simplest to the most severe—no two being equal."—*Researches in Operative Midwifery*, p. 12.

connected with the above three different orders of laborious labour progressively increased over one another in intensity, so the amount of male children connected with these labours would, in like manner, probably progressively increase in number.

Let us interrogate the data to be found in Dr. Collins' reports, in order to test practically the truth of an opinion which is so far merely theoretical.

Under the second proposition, we have already had occasion to state that, during Dr. Collins' mastership in the Dublin Lying-in Hospital, among the 16,414 labours which he has reported, the sexes of the infants born were in the proportion of 106 males to 100 females.

Out of 109 tedious and difficult labours, in which Dr. Collins has recorded the sex of the infant, and that occurred among these 16,414 deliveries, 65 of the children were male and 44 female.

In 24 forceps cases met with by Dr. Collins, the proportion of male to female children was still greater, the males being 16 and the females 8 in number.

The ratio of male infants mounts yet higher, when we turn to the cases in which the labour was so difficult as to require craniotomy. Among 74 instances in which the crotchet was used by Dr. Collins, and where the sex of the child is mentioned, the infant was male in 50 instances, and female in 24.

A tabular arrangement of the above results will show the proportion of male to female children under these different classes of head-presentations.

Nature of the Labour and Complication.	Total Cases.	No. of Male Children.	No. of Female Children.	Proportion of Males to Females.	Ratio of Excess of Males.
Labours generally . .	16,654	8548	8069	106 to 100	6
Tedious labours . . .	109	65	44	148 to 100	48
Forceps cases . . .	24	16	8	200 to 100	100
Crotchet cases . . .	74	50	24	208 to 100	108

The preceding data prominently show, that as the classes of labours increase in severity and difficulty, the proportion of male to female children in them increases in a corresponding degree. Evidence of exactly the same kind, in support of this opinion, may be gathered from a tabular extract of the cases that occurred in the Dublin Hospital during the mastership of Dr. Clarke (viz. from 1787 to 1793), published by that gentleman in the first volume of the *Transactions* of the King's and Queen's College of Physicians of Ireland,

p. 400. In this abstract Dr. Clarke states the sex of those infants that were still-born in the three classes of, 1. ordinary, 2. tedious, and 3. laborious labours.

During Dr. Clarke's mastership there occurred 10,199 cases of single or uniparous births. Among these, 340 children were still-born, though the labour was natural, that is, was terminated within 24 hours, and with the head of the fœtus presenting. Of these 340 still-born children, 170 were male, and 170 female. The ratio of the sexes shows this perfect equality in consequence probably of this list including principally putrid and premature children, among whom we have already found (see the eighth proposition) the number of still-born boys and girls to be nearly alike, and the over-proportion, if any, to be rather on the side of the females.

Under the term "Tedious Natural Labours," Dr. Clarke includes those which exceeded 24 hours in duration, but where there was no such disproportion between the head of the fœtus and the mother's pelvis, as to render *destructive* instruments necessary. This class of labours is produced either, he observes,[1] "by causes weakening the expelling powers of the mother, or increasing resistance to the passage of the fœtus." In Dr. Clarke's report, 134 cases are referred to this division, including 16 forceps cases. In these 134 labours, the child was still-born in 41 cases. Among these 41 still-born children, 26 were male and 15 female.

Dr. Clarke further reports the sex of the child in 48 cases of what he terms "Laborious Natural Labours," and where, to use his own words, "the disproportion between the head of the fœtus and the pelvis was so great that it became necessary to diminish the bulk of the former to save the life of the latter." Among these 48 crotchet cases, 32 of the children belonged to the male, and 16 to the female sex.

Of the 429 children that were thus still-born, in these different classes of natural or head presentations in Dr. Clarke's practice, the proportion of the sexes was therefore in the following ratio:—

Nature of the Labour and Complication.	Total No. of still-born Children.	Of these, were Male.	Of these, were Female.	Proportion of Males to Females.	Ratio of Excess of Males.
Ordinary Natural labour . . .	340	170	170	100 to 100	0
Tedious Natural labour . . .	41	26	15	173 to 100	73
Laborious Natural labour (Crotchet cases) . . .	48	32	16	200 to 100	100

[1] Dr. Clarke's Paper, p. 371.

The preceding data, from Dr. Collins' and Dr. Clarke's returns, will be probably admitted to be sufficient to prove the point that we have in view, and to warrant the following inference as a

NINTH PROPOSITION.

In "laborious labours," with the head presenting, in proportion as the order of labour rises in difficulty, the amount of male births in them rises in number.

To the proof that I have just given of the truth of this proposition, from the reports of Drs. Collins and Clarke, it gives me much satisfaction to add the following general confirmatory statement contained in an analysis of Riecke's elaborate obstetric statistics of the kingdom of Wurtemberg, published in the *Archives Générales.*[1] As one of the results of these statistics (the most extensive hitherto published in midwifery[2]), it is stated that "the proportion of boys to girls is much greater in 'artificial' than in ordinary labours, for it includes 7 boys for every 5 girls (or 140 male children for every 100 female). There is the same fact observable among the sexes of those children that are the products of artificial births, and who are either dead-born or die shortly afterwards, for among them the proportion of boys to girls is as 8 to 5 (or as 160 male to every 100 female infants). Often enough," it is added, "it happens that the same woman cannot, without aid, be delivered of a boy, who, at all her other confinements, when the child was female, required no assistance."[3]

THIRDLY, *A diminution of the cause leads to a diminution in the effects ascribed to it.*

We have alleged the cause of the increased casualties connected with male births to be the greater size of the head of the male than of the female infant.

In premature infants there does not exist so great a difference, as in those born at the full time, between the size of the head of the

[1] *Archives Générales de Médecine*, tom. xx. p. 76.

[2] They include 219,353 deliveries which occurred in Wurtemberg, during the four years, 1821-25. The artificial deliveries (*accouchemens artificiels*), or those requiring some special aid or interference, amounted to 7949. In these 7949 cases, 630 of the mothers and 3754 of the children were lost. The generalisation in the text seems to be founded upon the sex of the infant in these 7949 labours, and 3754 still-births.

[3] *Ibid.* p. 88.

male and female child. The fœtuses of the two sexes approach one another more and more in physical and other characters, the earlier the period at which we compare them. Besides, the cranium of the premature child is so compressible, from its deficiency of ossification, as to be much more easily reduced in size under the pressure to which it is naturally subjected in the process of parturition; and hence the slighter difference which may actually exist between the dimensions of the heads of male and female premature infants is still more diminished in its effects and operation during the course of labour.

Possessing such physical conditions, the birth of premature children should, from the diminished size and diminished resistance offered by their heads, give rise to fewer of those casualties in labour that we have attempted to trace to the influence arising from the greater size of the head of the full-grown male child.

I have no evidence to bring forward with a view of showing the influence of the birth of premature children, or their sex, on the difficulties of the labour in reference to the safety and life of the mother, because the labours with them are seldom or never so difficult as to induce any marked maternal complications. But we may derive equally good evidence in illustration of the point we are discussing, by studying the effects of the labours with premature children—not upon the *mothers* but upon the *infants* themselves. With this view I shall collect, from the data contained in Dr. Collins' report, the number of male and female children expelled *prematurely* and not putrid, in order to contrast them with the proportion of males and females among still-born children expelled at the *full time* and not putrid. Of the former there were born in all 62, of the latter 532. The ratio of the sexes in each series stands thus:—

Non-putrid Children still-born.	Total.	Males.	Females.	Proportion of Males to Females.
At full time . .	532	320	212	151 to 100
Prematurely. .	62	34	28	121 to 100

The comparison of the two columns in the above table shows that, among the children who died immediately before or during labour, and who had reached the ninth month of utero-gestation, the proportion of males to females lost was considerably greater than among still-born children born prematurely—and, as we believe, for this reason, that in the latter (the premature still-births),

there is not, as we have pointed out, so great a distinction between the male and female heads as among children at the full time. The comparison of the proportion of males to females who died within ten days after delivery among, 1st, children born at the full time, and, 2d, those born prematurely, leads to the same inference—viz. that as in the latter the alleged cause of distinction between the relative size of the male and female head is diminished, the alleged effect upon the differences displayed between the mortality of the two sexes is also proportionally lessened. The following table is intended to illustrate this point. The calculations are from the data in Dr. Collins' chapter on children dying in the hospital.

Children dying within 10 days after birth.	Total.	Males.	Females.	Proportion of Males to Females.
Born at full time	171	106	65	163 to 100
Born prematurely	102	56	46	121 to 100

The remarks that we have made regarding the heads of premature children should apply equally to those of twins. Twin children, like those born prematurely, are in general below the standard size and weight, and, in the same manner, have their heads less ossified, and hence more compressible, than those of single infants at the full time. There is, consequently, also a less marked difference between the relative size of the male and female head, among twin children, than among single children at the full time; and for the same reason, if our views are true, there should be a similar less marked difference between the mortality of the two sexes among twins, at birth and for some time after it. That such is in reality the case, I shall allow Dr. Clarke to state in his own words. Speaking of the relative male and female infantile mortality in the Dublin Hospital, he observes,[1] "It is worthy of observation that though *double* the number of twins die and are still-born, compared to single children, yet the proportion of male twins lost to females is *less*. Only one-fifth more of the male sex die than of the female, and only one-third more is still-born. Whereas of single children, whose proportional mortality is one-half less, *one-fourth* more of the male-sex die, and near double the number is still-born. To what, then, are we to attribute this lessened mortality in favour of male twins? Probably to their brain and nervous system suffering less during delivery, on account of their heads being much smaller

[1] *Philosophical Transactions*, vol. lxxvi. p. 354.

than those of single children."[1] In other words, the cause of the higher mortality, or the relative size of the male over the female head, being diminished, the effects which we attribute to it—viz. the higher infantile mortality among male children—are also proportionately diminished.

FOURTHLY, *In those morbid complications in labour in which the cause is in abeyance, the effect is also absent.*

There are some morbid complications during labour which are independent of the presence, and hence of the sex or size, of the infant. I allude especially to those complications which occasionally occur during the third stage of labour, and consequently after the total expulsion of the child. It would afford no small corroboration of the preceding remarks and inferences, if in these cases, where all agency from the conditions of the infant was for the time being excluded, the morbid complications which may take place were found to occur as frequently in connection with the birth of female as of male infants. And such, we believe, may be shown to be the fact.

The two principal complications that occur during the third stage of labour are morbid retention of the placenta and hemorrhage.

Dr. Collins reports 70 cases of retention of the placenta, 35 of them after male, and 35 after female births.

Hemorrhage took place during the third stage of labour, or between the birth of the child and placenta, in 71 cases during Dr. Collins' mastership. In 36 of these 71 labours the child was of the male, and in 35 of the female sex.

These observations, when thrown into a tabular form, would consequently stand thus:—

Nature of Complication.	Total Cases.	With Male Children.	With Female Children.	Proportion of Males to Females.
Retention of placenta	70	35	35	100 to 100
Hemorrhage during third stage . .	71	36	35	100 to 100

[1] In the Dublin Hospital, from the year 1757 to 1784, it appears from Dr. Clarke's tables, that among the twin-births 29 males and 20 females were still-born, and 116 male and 91 female children died within a fortnight after delivery; on the other hand, among the uniparous or single births, 602 males and 351 females were still-born; and 1656 males and 1247 female children died within a fortnight after birth. These data form the ground of the inferences drawn by Dr. Clarke in the passage quoted in the text.

The evidence afforded by the above table is probably sufficient to entitle us to add to those inferences that we have already laid down, the following deduction as a

TENTH PROPOSITION.

Of the morbid accidents that are liable to happen in connection with the third stage of labour, as many take place with female as with male births.

To prove that the slight increase of size of the male over the female infant's head is the true antecedent or cause of the greater number of casualties accompanying male births, we may so far change the ground of direct proof which we have been hitherto attempting to pursue, and proceed to show, as a matter of strong though indirect evidence, that—

FIFTHLY, *Similar effects upon the mother and child are produced by other causes similar in their character and amount.*

If the larger dimensions of the head of the male infant be the immediate cause of the larger number of accidents and deaths attendant upon male births, its greater degree of *size* could only possibly lead to the results in question, by offering a greater proportionate degree of impediment to the passage of the fœtus through the pelvic canals. Its effects, therefore, upon the mother and child should be such as are produced by obstructed labour. That the various consequences which we have previously traced are all of that description, it is unnecessary for us to point out to the obstetric pathologist. It might be considered, however, as confirmatory of this fact, and, at the same time, as the strongest correlative evidence that could be adduced of the power of *slight* obstructions, during labour, to lead to these effects, if we could prove that in any other extended series of cases, in which obstructions of the same amount existed, the same or similar effects resulted both to the mother and child. Our evidence would only be the stronger if, in this class of cases, we could so far reverse the state of matters as to transfer the existing slight obstruction from the body passing to the passages themselves. The circumstances connected with first labours offer the exact conditions which we seek.

In first labours, taken as a class, there is a greater obstruction to the transit of the child than in subsequent deliveries, in consequence of the maternal passages being less dilatable than afterwards.

The two causes of obstruction—viz. the increased size of the fœtal head, and the diminished size of the maternal passages—though different in their seat, are nearly analogous in the nature of their influence, and in the amount of that influence.

In male births, the body passing (the head of the infant) is slightly *greater* than in female births, whilst, *cæteris paribus*, the maternal passages are the same. In first labours the capacity or dilatability of the maternal passages is slightly *less* than in subsequent labours, whilst, *cæteris paribus*, the head of the infant remains the same, there being at least an equal number amongst them of males and females. Having stated these premises, we shall go on to point out, as another reason for supposing the size of the male head to be the sole cause of the danger of male births, that, in accordance with our proposition, most of the complications and accidents, which have been already described as arising in male, as compared with female births, from the comparatively slight increase in the dimensions of the male head, occur also in first, as compared with future labours, in consequence of the comparatively slight diminution of the dimensions or dilatability of the passages in these labours.

We shall give the proofs of this as an illustration of another, or

ELEVENTH PROPOSITION.

More dangers and deaths occur both to mothers and children in first than in subsequent labours.

Among the 16,414 women delivered in the Dublin Hospital during Dr. Collins' seven years' mastership, 4987 were confined for the first time. First deliveries occurred, therefore, in the proportion of about 30 in every 100 cases. If, however, in studying the various morbid complications which have been statistically reported by Dr. Collins, we find the proportion of these complications in first labours to be greatly above the ratio of 30 per cent, it would tend to show that there is a stronger liability to their occurrence in first than in future deliveries. To gain some data in this question, let us examine into the facts which may be gathered from Dr. Collins' returns in regard to the proportion of these morbid accidents arising from obstruction during parturition, which were met with in first as compared with subsequent labours.

Convulsions. — Of 30 cases of convulsions described by Dr. Collins, 29 occurred in women who were pregnant for the first

time.[1] Thus they were found in connection with first pregnancies in the ratio of 96 in 100.

Crotchet cases.—Of the 79 cases which Dr. Collins mentions as requiring craniotomy, the number of the pregnancy in each can be made out only in 75. Of these, 51 were first labours;[2] or out of every 100 cases in which the crotchet was used, 68 were first deliveries.

Forceps cases.—The forceps were employed in 24 instances. Of these, 18 were first labours.[3] Hence, out of every 100 instances in which this instrument was used, the proportion of first labours, according to this average, would be 75.

Tedious labours.—Under our second proposition I have already stated that Dr. Collins has given so far the history of 109 instances of tedious labours.[4] Of the 109 cases, 75 were first confinements;[5] thus giving for every 100 cases a proportion of 69 as pertaining to first deliveries.

Puerperal fever.—Out of 88 women attacked with puerperal fever, 44 were confined for the first time.[6] Thus this complication supervened upon first labours in the ratio of 50 in every 100 cases.

Maternal deaths.—We have already seen, under the first proposition, that of the 16,414 women delivered in the Dublin Hospital during Dr. Collins' charge of it, 164 died. Of these 164 mothers, 86 had given birth to first children;[7] or of every 100 women who died, 53 had been confined for the first time.

Still-births.—Under this head we exclude from our calculation all those children who were born putrid, either prematurely or at the full time. Of 1121 still-births in all, observed by Dr. Collins, 594 were born not putrid. Of these 594 children, 260 were the product of first confinements; or, in other words, they were found in connection with first pregnancies in the ratio of 45 to 100.

Infantile deaths during the first eight or ten days after birth.—The mothers and their infants generally, as we have seen, remained for that time in the hospital after delivery. During it 284 of the children died. Of these, 170 were single children born at the full time.[8] Of the 170, 75 were the offspring of primiparæ; or infantile deaths, during the first ten days, among single children born at the full time, occurred in connection with first pregnancies in the ratio of 44 in every 100.

[1] *Practical Treatise*, p. 201. [2] *Ibid.* Table, p. 490, *et seq.* [3] *Ibid.* p. 15.
[4] *Ibid.* p. 462, *et seq.* [5] *Ibid.* Table, p. 490, *et seq.* [6] *Ibid.* p. 284.
[7] *Ibid.* p. 363. [8] *Ibid.* Analysis of Table, p. 519, *et seq.*

The preceding series of facts, if arranged together into a general tabular form, would stand as follows. In reading these arranged results, it is to be recollected that the *standard proportion of first pregnancies, in the general sum of the labours, amounts only to* 30 *per cent;* whilst, as shown by the table, the proportion was much higher in the various complications under mentioned.

Complication.	Total Cases.	1st Pregnancies.	Proportion of 1st pregnancies.
Convulsions	30	29	96 in 100
Forceps cases	24	18	75 in 100
Crotchet cases	75	51	68 in 100
Tedious labours . . .	109	75	69 in 100
Puerperal fever . . .	88	44	50 in 100
Maternal deaths . . .	164	86	53 in 100
Still-births, not putrid .	594	260	45 in 100
Infantile deaths during 1st 10 days; born single and at full time . .	170	75	44 in 100

The results which the above table is intended to display might perhaps be brought out more strongly by another arrangement, if our data for it were more complete. Dr. Collins mentions the number out of the 16,414 patients that were delivered for the first time, viz. 4987; of these 72 were twin births. Unfortunately, however, for our present purpose, he has omitted to give the exact numbers of those that were confined in their second, third, and other subsequent labours. But an approximation, sufficiently near for the purpose we have in view, may perhaps be made without any probability of a very serious error. To have the required standard of comparison, I shall take it for granted, for reasons which it is unnecessary to dwell upon, that the percentage of first and future labours in the Dublin Hospital was nearly as follows :— Of all the cases, about 30 per cent were first pregnancies; 22 per cent second pregnancies; 15 per cent third pregnancies; 11 per cent fourth pregnancies; 8 per cent fifth pregnancies; 5 per cent sixth pregnancies; 3 per cent seventh pregnancies; 2 per cent eighth pregnancies; 1 per cent ninth pregnancies; and 3 per cent belong to women who were confined for the tenth time or upwards.[1]

[1] This calculation of percentages proceeds on the assumed probability that, of the 16,414 women delivered in the Dublin Hospital under Dr. Collins, 4924 were cases of first labour; 3611 were of second labours; 2462 third labours; 1806 fourth labours; 1313 fifth labours; 826 sixth labours; 495 seventh labours; 328 eighth labours; 164 ninth labours; and 491 were instances in which the women were delivered for a tenth or later time.

If we compare with this given standard the proportion of instances in which the different complications we have been considering occurred in different pregnancies, we shall see in a marked degree the great over-proportion of them in connection with first deliveries. I have constructed the following table with this view.

Table showing the percentage of Cases of Natural and Morbid Labours belonging to different Pregnancies.

Percentage of pregnancies.	1st.	2d.	3d.	4th.	5th.	6th.	7th.	8th.	9th.	10th and subseq.
Total No. delivered in Hospital .	30	22	15	11	8	5	3	2	1	3
Convulsions . . .	96	4	0	0	0	0	0	0	0	0
Tedious labours . .	69	9	7	3	2	3	2	1	3	1
Forceps cases . . .	75	?	?	?	?	?	?	?	?	?
Crotchet cases . .	68	10	7	4	0	3	?	0	2	4
Puerperal fever . .	50	19	10	7	8	0	2	4	0	0
Maternal deaths . .	53	16	7	7	5	4	1	3	1	3
Still-births	45	17	11	8	5	5	4	3	4	8
Infantile deaths for 10 days after birth . . .	44	15	11	8	8	7	2	3	1	2
Post-partum hemorrhage . . .	33	16	10	9	9	5	4	6	3	6
Rupture of uterus .	21	18	18	6	6	15	6	3	3	10

In regard to the two complications which we have placed at the bottom of the above table—viz. post-partum hemorrhage and rupture of the uterus—it will be observed that our present proposition does not hold out so strictly with regard to them, and that they do not occur comparatively more frequently in first than in subsequent labours. But this does not detract in any way from the previous view which we took of them, as occasional results of the partial obstruction offered by the male head. For there are sufficient reasons why they should occur more rarely in first labours, though these labours are more obstructed than those that occur subsequently. In regard to rupture of the uterus, for example, it is now well known to obstetricians that two causes may give rise to its occurrence—namely, *first*, over-action of the uterus, in consequence of impediment to the passage of the child;[1] and, *secondly*, any such

[1] "There is one fact," observes Dr. Collins, "which clearly shows disproportion to be a frequent cause, namely, its being oftener met with in the expulsion

diseased condition of a portion of the uterine parietes as renders that portion less resistant, and hence more easily lacerated, than the other parts of the uterine walls. The first of these two causes is in much stronger operation in male than in female births, and in first than in future labours ; but the second cause comes more and more into action with the frequency of the previous parturitions, the uterine tissues being more and more liable to disease under the strain of each successive pregnancy and labour. Hence, though lacerations from obstruction are more common in first confinements, the same accident, as a result of disease of the uterine structures, is far more frequent in subsequent and later parturitions, so much so indeed, as to cancel any argument that might be derived in favour of its origin from mere obstruction, by the study of it in primiparous mothers.

Again, post-partum hemorrhage, though more apt, as we have already stated, to occur in cases in which the uterine action has been protracted, and the contractile powers of the organ morbidly exhausted, is not so liable to appear after tedious first labours as after tedious subsequent labours, because it is a well-known and acknowledged fact, that altogether the uterus contracts more perfectly and securely after first labours than after others. Hence the well-known rarity of after-pains subsequently to first parturitions. "A woman," says Dr. Power, "experiences little or no after-pain with her first parturition, because the parietes of the uterus, not having been weakened by previous distension, contract more perfectly and permanently, so as to obliterate and empty the cavity thoroughly."[1]

In reference to the bearing of some of the results included in the above tables upon the question we are discussing, it is proper also to add, that the ratio in which some of the complications occurred in first pregnancies, is greater in degree than can be accounted for upon the doctrine of obstruction, and is partially dependent upon other co-existing causes. I allude more particularly to the case of puerperal convulsions. It is well known that in the practice of all accoucheurs this complication is met with, principally

of male children. Thus, of thirty-four cases which I am about to state, twenty-three of the children were males, etc. This is satisfactorily accounted for by the greater size of the male head, as proved by accurate measurements made by Dr. Joseph Clarke."—Chapter on Rupture of the Uterus and Vagina, in *Practical Treatise*, p. 242.

[1] *Treatise on Midwifery*, p. 190.

in first, and comparatively rarely in future deliveries.[1] The mere amount of obstruction present in first labours is not the sole explanation of the large percentage of convulsions occurring in first confinements, for impediments in the maternal passages in future deliveries are not followed in any such degree by the same consequence; and further, obstetric pathologists are now well aware that, in almost every case of puerperal convulsions, a predisposition to the affection is given by one or more particular pre-existing morbid states of the system. Various authors, as Demanet,[2] Osiander, Chailly, Johns, etc., have correctly described the most common pre-existing morbid condition as one marked by dropsical effusions in the face and elsewhere. Of late years the pathology of these cases has been advanced a step farther, and the complication of convulsions shown to occur only, or almost only, in women who have such confirmed or temporary renal derangement as is marked by an albuminous state of the urine. Dr. Lever suggests that this albuminous state of the urine, the common state predisposing to puerperal convulsions, is produced by pressure of the enlarged uterus upon the renal veins. If this were the explanation, this complication should occur as frequently in subsequent as in first labours, because the renal veins are not more especially compressed in the one than in the other. But to discuss any such question at present would be wandering from our subject. We have said enough to show that, in regard to puerperal convulsions and their frequency in first labours, we must take other points into consideration than the mere degree of obstruction, in order to account for their high over-proportion in first pregnancies.

Before we proceed farther, let us pause for a minute, and simply

[1] The following Table will show this fact better than any lengthened commentary:—

Reported by	Total No. of Puerperal Convulsions.	No. of these occurring in first labours.
F. Ramsbotham .	59	45, or 57 per cent.
J. Ramsbotham .	22	15, or 68 ,,
Lee	46	30, or 65 ,,
Merriman . . .	48	36, or 75 ,,
Clarke	19	15, or 79 ,,
Johns	9	8, or 89 ,,
Collins	30	29, or 96 ,,
Total	233	178, or 76 per cent.

[2] "Regarde l'anasarque comme une de leurs causes *essentielles*."—*Recueil Périodique de la Société de Médecine*, tom. ix. for 1800-1, p. 110.

recapitulate the reasons that we have already given for considering the greater size of the head of the male child as the cause of the greater number of complications and casualties connected with male births. *First*, I have shown that for the very marked differences existing between the difficulties and perils of male, as compared with female births, there is no other traceable cause, in the mechanism of parturition, than the larger size of the head of the male child. We have seen, *Secondly*, that an increase in the morbid effects may be proved to be connected with an increase in this reputed morbific cause; *Thirdly*, that when the alleged cause is diminished, the effects are diminished; and *Fourthly*, that in those morbid complications in labour in which the cause is in abeyance, the effect is also absent. *Lastly*, we have found that similar effects upon both mother and child are produced by other causes which are similar in their character and amount.

Now if, in conducting any investigation into the explanation or mode of production of a number of ascertained and acknowledged facts, we found, amidst the assemblage of phenomena submitted to our study, one supposed antecedent condition or probable proximate cause perfectly answering the various reasons and tests to which, in the preceding pages, we have already subjected the increased size of the male over the female infant's head as the alleged cause of the reputed greater danger and mortality attendant upon male births, the evidence, in support of that circumstance as the *vera causa* of these consequences, would be deemed of a very strong and decided character. The evidence would become still more conclusive if it could be shown, that though this *vera causa* appeared at first sight to be in itself an agent quite inadequate for an explanation of the various important effects traced to it, yet, when studied in its full and proper relations, it could be proved to have necessarily sufficient power and influence for the production of the results. Such we shall now endeavour to prove to be the case with the slightly increased volume of the head of the male over that of the female infant, as the cause of the greater number of the casualties accompanying the birth of male children.

Sixthly, *The greater size of the male than of the female infant's head is sufficient in itself to explain the greater dangers attendant upon male than female births, when we consider it in relation to its absolute and cumulative effects.*

"No arguments are required," as Dr. Denman observes, "to prove that a small body will pass through a small space with more

facility than one that is large ; the size of the body being supposed to bear any reasonable comparison to the dimensions of the space. Of course it may be presumed that the larger the head of the child is at the time of birth, with the greater difficulty it will be expelled." Nor does the well-known compressibility of the human cranium at birth alter this view in regard to the effects which an increased size of the head is calculated to produce. "For though nature has, with admirable wisdom," I quote the words of Dr. Osborne, "by means of sutures and fontanelles, so constructed the head of the human fœtus, that, in the passage through the pelvis, it may suffer the form to be altered and the volume to be considerably diminished without such injury to its contents as shall necessarily destroy life ; yet as there is a volume beyond which each fœtal head cannot suffer compression with safety—so there is another and still smaller into which it cannot be compressed at all."[1]

No one will be inclined to doubt the fact, that when the fœtal head is *much* increased beyond the common size at birth, its expulsion will be attended with more than the usual degree of difficulty. But exactly the same effect may be produced by the infantile head exceeding the required dimensions in only the most trifling degree, provided it happens, from the particular conformation of the mother, that the maternal pelvis and fœtal cranium are otherwise very nearly and accurately adapted to one another. In such instances a difference in the size of the head, of the smallest amount, may involve and change the whole question of the physical possibility or impossibility of the passage of the infant. Dr. Hamilton, in his *Practical Observations*, when speaking of the occasional difficulty of determining in individual cases in practice, whether the maternal passages are or are not of such dimensions as to allow the child to pass, and whether the infant's head may or may not require to be diminished by craniotomy, strongly remarks, "that in this question even a miscalculation of the *sixteenth part of an inch* might be fatal to the life of an infant." "The author," he adds in a foot-note, "has been accustomed to illustrate this practical remark to his pupils by a very simple mechanical demonstration. He first shows the smallest possible aperture through which the fœtal head of the ordinary size can be squeezed, and he then covers the head with a common towel, and proves the utter impossibility of its then passing through the same aperture. He does not believe that the addition

[1] *Essays on the Practice of Midwifery*, p. 188.

of a common towel can increase the diameter of the head more than the sixteenth part of an inch." [1]

If Dr. Hamilton's calculation regarding the increase of the diameter of the head in this experiment be true—viz. one-sixteenth of an inch—then here we have the transit of the fœtal head entirely prevented by an increase of size which is not more than half of that difference (one-eighth of an inch) which we have seen to exist between the diameter of the standard male and the standard female head at birth.

In relation to the question of the greater difficulties attendant upon male births, it ought further to be always held in view, that, when the fœtal head is notably above the medium standard, the infant is, in a great majority of instances, of the male sex. Among the 120 infants whose heads were measured by Dr. Clarke, only six were above $14\frac{1}{2}$ inches in circumference. These six were all males. Twenty-nine of the children were as high as 8 lbs. and upwards in weight. Of these 29, as many as 19 were of the male, and 10 only of the female sex. Such facts require no comment.

But let us throw altogether out of consideration the more extreme cases to which we have adverted, and look upon the question of the more numerous dangers attendant upon male births as the result merely of the average slight increase of the standard male over the standard female head at birth. Even under this limited view, the normal difference in size between them (about one-eighth of an inch in diameter), inconsiderable as it may at first appear, will, we believe, afford us a perfectly sufficient explanation of the statistical facts which we have brought forward in the preceding pages, provided we consider what the *accumulated* mechanical effects of this difference in measurement would be when operating over a very wide and extended range of cases of parturition. A few remarks will illustrate our meaning. We take for granted, that the act of parturition consists of the dilatation of the female passages, and of the expulsion of the fœtus through them. Before the process can be terminated, a very considerable amount and continuance of expulsive and dilating force is in general required. During it, the parietes of the maternal passages are necessarily subjected to pressure from the advancing fœtal head, and in turn the wedge-like fœtal head itself is compressed by the resisting passages. The whole process is rendered the more tedious and difficult in consequence of the size of the head of the fœtus being nearly pro-

[1] Hamilton's *Practical Observations*, second edition, p. 254.

portioned to the size of the passages of the mother. What, then, will be the effects upon this whole process, of such a difference in the dimensions of the fœtal head as holds good with regard to the relative sizes of the male and female at birth, supposing the mother's pelvis and passages to be always, *cæteris paribus*, the same in their capacity? If the female infant's head, when of the standard size, require for its transit a certain extent of dilating and expulsive force —if it necessarily produce, during its egress through the maternal passages, a certain amount of pressure upon their walls in order to overcome the resistance which they offer—and if, in turn, the head of the child be, under the same action, compressed itself to a certain degree;—then the standard male infant's head (as being an eighth of an inch greater in diameter, and consequently demanding more actual space for its transit), will require proportionately a greater extent of dilatation in the maternal passages, and a greater expenditure of force to effect this greater dilatation; it will hence also produce, during its egress through the maternal canals, a greater amount of pressure upon their parietes, and be itself reciprocally compressed to a greater degree. The difficulties and dangers to child and mother entailed by this latter state of matters might well *a priori* be supposed to be exactly those that we have shown them really to be, under the various propositions that we have previously laid down.

But that the birth of the male, as compared with the female child, is accompanied with more obstacles and delay, need not be an inference resting solely, as it does above, upon abstract though satisfactory reasoning—for it is a matter which should admit of direct statistical and arithmetical proof. If our data were sufficiently precise and extensive, we ought to be able to prove, that, as a

TWELFTH PROPOSITION,

The average duration of labour is longer with male than with female children.

Dr. Collins has given a table[1] showing the number of his patients that were delivered in "one quarter of an hour," "in one hour," "in two hours," etc., from the commencement of labour. The sexes, however, of the children are not distinguished, so that the data are of no avail in regard to their bearing upon the proposition we have just stated. Nor am I aware that there has been, as yet, anywhere published such a series of facts as would enable us to prove statistically that the birth of the male child is absolutely longer than that

[1] *Practical Treatise*, p. 22.

of the female, in the time required for its completion. The average duration of labour in the European female is about four or five hours. The average duration of male births will probably be found, when sufficient evidence is collected, to be about a quarter of an hour or half-an-hour longer than that of females. I venture to make this allegation, in regard to the common run of labours, upon the evidence afforded by an assemblage of cases, now lying before me, in which the process was somewhat protracted beyond the usual standard. The cases I allude to were collected under the following circumstances. In 1836 a separate register was begun in the Edinburgh Lying-in Hospital of those labours in which the date of the commencement of the process and the comparative length of each successive stage could be ascertained with sufficient accuracy. Those cases in which the labour was very speedy, and indeed all that were less than three or four hours ill, were not entered, because in most of them the duration of the labour and its stages could not be noted with the accuracy required; many of these patients only entering the hospital a few minutes before delivery. About half of the labours in the Dublin Hospital appear to have been terminated within the first two or three hours,[1] so that our Edinburgh register, as wanting that proportion of the more rapid cases, cannot show the average length of the process in ordinary instances. The records, however, which it contains of the cases protracted beyond the period mentioned have, I know, been kept with adequate care,[2] and seem capable of furnishing us with sound and unprejudiced evidence upon the present topic, inasmuch as they were originally noted without any view to such an inquiry as this into the comparative duration of male and female births. In analysing the register, I find, that, from 1836 to 1841 inclusive, 249 male and 178 female births are entered, with notes of the precise length of the labour in each. The following table will show the absolute and average duration of the labours with male and female children in these 427 cases:—

Labours.	Absolute duration of the whole cases.		Average duration of each labour.	
	Hours.	Minutes.	Hours.	Minutes.
With male children (249 in number) .	2646	33	10	38
With female children (178 in number) .	1702	29	9	34
Average greater length of the male birth . .			1	4

[1] Of the 15,850 cases noted by Dr. Collins, 7063 were terminated within two hours, and 9550 within three hours, from their commencement.

[2] A number of the entries were made by myself when annual pupil at the hospital in 1836-7, and have been continued by others in that office.

In those classes of labour in which the process becomes morbid from tediousness or other complications and difficulties of a more serious character, the difference between the duration of the male and female births would seem to be even greater than the above table displays. At least such an inference appears deducible from the analysis which I have made, from Dr. Collins' tables, of the comparative length of the male and female births in the records which he has given of 507 still-born children (including the putrid and premature), of 97 morbidly tedious labours, of 68 crotchet cases, and of 130 instances in which the mother died in connection with delivery. The preceding numbers include *all* the cases, under these several heads, in which the exact duration of the labour is mentioned in Dr. Collins' tables. The result is this :—

Labours.	The average duration of the male births was		The average duration of the female births was		The average greater length of the male births was	
	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.
With still-births (310 males and 197 females)	14	27	12	10	2	17
Morbidly tedious (56 males and 41 females)	43	18	40	12	3	6
Requiring crotchets (44 males and 24 females)	42	22	38	20	4	2
Leading to death of the mother (86 males and 44 females) . .	18	9	12	58	5	11

The evidence afforded by the foregoing table appears almost enough to warrant us in qualifying the proposition we have laid down, to this extent, that "the average duration of labour is longer with male than female children, and the difference in this respect, between male and female births, becomes increased in length when the labours become more severe and dangerous in their character."

The remarks and proofs that we have now offered may tend to remove the difficulty which the inquirer may at first entertain regarding the supposed inadequateness of the slightly increased size of the male head to produce all the greater number of casualties and complications that we have traced to be connected with male births. For it will probably be allowed that the principal, or indeed sole obstacle, which the mind has to contend with, in allowing the very small size of the male over the female infant's head to be the cause of the remarkable differences which we have

traced between the results of male and female births, consists in the difficulty of at first supposing so slight an apparent cause to be the agent by which such remarkable consequences are brought about. But in considering this and the analogous questions, it must be held in recollection, that in all processes, whether vital or physical, in which, as in parturition, an established relation of mechanical conditions is required, any disturbance in these conditions, however small and trifling in itself, will ultimately, and when followed out through numerous and extended series of observations, be found to lead to results the magnitude of which could scarcely have been previously surmised. These results may not be appreciable when we confine ourselves to the study of the agency in an individual case, or in a small number of cases merely, but they become more and more marked in proportion as the number of our instances becomes more and more extensive. The effects cannot be distinctly seen when we look for them in a limited series of data; but they may be evoked with all the force of a mathematical demonstration, when we prosecute our calculations for them among large and accumulated masses of observations. From any study, however minute and accurate, of a limited number of cases of labour, no man would probably feel himself entitled to conclude that male are in any notable degree more difficult and dangerous than female births; but this, as we have seen, becomes a demonstrable and strongly-marked fact, when we direct our inquiries after the truth of it into the records of hundreds or thousands of carefully-reported observations, such as we have made use of in the course of the preceding inquiry.

The remarks we have hitherto made upon the male sex of the child as a cause of delay, difficulty, and danger during labour, have referred principally to the larger size of the male infant's head or cranium. In that condition, and its effects, we have so far found a satisfactory explanation of the numerous complications and casualties to which the mother herself is subjected in male births. One or two additional observations may be required to show more specifically in what manner the safety and life of the male child during labour, and for some time after it, is endangered by the same circumstance. We believe that the larger size of the contents of the male, than of the female cranium, or, in other words, the larger size of the male brain or encephalon at birth, and the consequent greater compression and injury to which it is subjected during birth, affords us the proper clue to the explanation of these peculiarities in the male infantile mortality.

The weight, and hence the size of the brain, is now well ascertained to be absolutely more in the adult male than in the adult female. From measurements of the interior of numerous crania, Sir William Hamilton[1] computes the male adult encephalon as weighing 3 lbs. 8 oz. troy, and that of the adult female as 3 lbs. 4 oz. Professor Reid carefully weighed in the Edinburgh Infirmary the encephalon of 53 adult males and 34 adult females. The average weight of the male brain in these observations was 3 lbs. 2 oz. 3½ drachms; that of the female, 2 lbs. 12 oz. 8½ drachms; and the average difference in favour of the male encephalon thus amounted to 5 oz. 11 drachms.[2] This difference in weight between the encephalic contents in the two sexes exists also at birth. In an elaborate paper on the weights of the brain in the different sexes, etc., by Professor Tiedemann,[3] founded on numerous observations, that distinguished anatomist states that "the female brain weighs on an average 8 ounces less than that of the male, and this difference is," he adds, "already perceptible *in a new-born child*." In one of his tables Tiedemann adduces the weight of the brains of two male and two female infants at birth. The average weight of the two male brains was 13 oz. 6 drachms 20 grains; the average weight of the two female, 10 oz. 44 grains; and the average excess of size of the encephalon of the male infant, as deducible from these four observations, 3 oz. 5 drachms 36 grains. But this result is probably much higher than a more extended number of data would give, in consequence of one of the female children in the table being evidently below the standard size and weight of the girl at birth.

There is another way by which, in the present deficiency of direct facts bearing upon this point, we may arrive at the same conclusion with equal or greater certainty. "The weight of the brain," says Tiedemann, "of a new-born child is relatively to the size of the body as one to six." The male infant at birth is, as we have seen, on an average, about nine or ten ounces heavier than the female. If the above ratio between the brain and whole body holds equally true (as there is every reason to believe) of the two sexes, the male brain should, on an average, be one-sixth part of this heavier than the female brain at the time of delivery. Hence the

[1] Monro's *Anatomy of the Brain*, 1831, p. 12.

[2] *London and Edinburgh Monthly Journal* for 1843, p. 322. See also Dr. Sim's paper in the *London Medico-Chirurgical Transactions*, vol. xix., for similar results.

[3] *London Philosophical Transactions* for 1836, p. 502.

male encephalon is, in the infant at birth, about 1½ ounce heavier than the female encephalon, and the male brain and cerebellum altogether about one-ninth or one-tenth greater in weight, and consequently in size, than the brain and cerebellum of the female.

The immediate effects, during parturition, of this much greater size of the male encephalon upon its own delicate structures are evident. For as, *cæteris paribus*, the pelvic passages are always the same in their dimensions, the larger and heavier male brain will, in its forcible transit through the given standard space of the maternal canal, of necessity suffer more physical compression and injury than the smaller female head and brain.

Connected with the structural economy of the brain of the newborn infant, there are some circumstances which are calculated to render such degrees of injury as we have adverted to, more extensive in their influence, and more permanent in their results, than similar amounts of injury of these same parts at other later periods of life. For, *first*, the brain of the infant at birth is still so soft and almost semifluid, and its vessels so large, as to be more easily lacerated than years afterwards under the same extent of pressure. *Secondly*, the brain at that particular period of life, and for ten or twelve months afterwards, is undergoing great and rapid normal changes from its imperfect embryonic state to the anatomical consistence, form, and organisation which it is to present during the remainder of life. "From birth," observes Billard, "to the first year, the brain of the infant is in a true state of transition, so that this organ, which is scarcely formed at first, arrives, towards the ninth month or first year, at the organisation proper to the brain of adults. Ought we not," he adds, "to attribute to this modification supervening in the brain of infants, the frequency of cerebral affections at the age of which we speak?"[1]

But there is a *third* peculiarity, probably even more important than the two others. The human brain is very much larger in proportion to the body in the infant, than it is in the adult. In a full-grown adult the proportion of the brain to the body is as about 1 to 40; in the infant it is, as we have already stated, about 1 to 6, or nearly seven times greater. The influence of this immense difference is important both physiologically and pathologically.[2]

[1] Billard, *Traité des Maladies des Enfans*, p. 335, Brussels ed.

[2] Tiedemann, on whose authority I have given the respective proportion, stated in the text, of the whole brain in the infant and in the adult, observes, in relation to this point, and his words apply equally to the morbid as to the healthy

The nervous system in the infant is thus rendered naturally much more susceptible and sensitive of physical and sympathetic morbid impressions than at a more advanced age ;[1]—pathological irritations and disturbances of other parts are far more readily and strongly reflected upon the nervous centres ;—and, for the same reason, any direct lesion or disease of the brain itself comes also in turn to exert a more potent and extended effect upon the general and individual functions of the body, than at other later periods of life. All these conditions are heightened and increased in the male as compared with the female infant at birth, both, *first*, by the greater absolute size of the male brain ; and, *secondly*, by the greater lesions and injuries to which it is subjected during the process of labour. I have collected some statistical data to show that the particular diseases which destroy so many more male than female children immediately after birth and for a short time subsequent to it, and which are therefore the evident and demonstrable causes of the excess of the male over the female mortality at that early period of life, are all such as are capable of receiving an explanation of their more marked frequency, severity, and danger upon the above principles, in conjunction with the consideration of the increased size and increased injuries, at birth, of the male as compared with the female encephalon. To adduce evidence of this to the amount that might be necessary, would require us to extend this essay far beyond the limits prescribed to it, and these it has already far overstepped. I may, on another occasion, return to the subject ;

states of the system, "The different degrees of susceptibility and sensibility of the nervous system seem to depend on the relative size of the brain as compared with that of the body. Children and young people are more susceptible, irritable, and sensitive, than adults, and have a relatively larger brain. In diseases which affect the nourishment of the body, the susceptibility increases as the patients grow thinner. The susceptibility and sensibility decreases, on the other hand, with persons recovering from a long illness gradually as they regain their strength. The degree of sensibility in animals is also in proportion to the size of the brain. Mammalia and birds have a large brain, and are more susceptible than amphibious animals and fishes."—*London Philosophical Transactions*, vol. cxxvi. p. 503.

[1] "The nervous system in infants is naturally in a very susceptible condition ; it is consequently easily excited on the application of the slightest impressions. This constitutional irritability is characteristic of the infant state. . . . . The nervous sensibility is in excess at this age, and whatever be the disease with which the infant is affected, a morbid excitability and irregularity of action in the nervous system are more or less its attendants."—Stewart's *Practical Treatise on the Diseases of Children*, New York, 1841, p. 494. See also Maunsell and Evanson on the *Diseases of Children*, p. 13, etc.

and, in the meantime, shall only add, that the particular affections alluded to, as producing the excess of the male over the female mortality, which is so remarkable at birth, and progressively decreases from that time onwards, are almost all referable in their origin or course to morbid states and disturbances of the nervous system,[1] and to functional derangements and inflammatory action in it and other organs of the body.

PRACTICAL INFERENCES, AND EXTENT OF INFLUENCE EXERTED BY THE MALE SEX OF THE INFANT UPON THE GENERAL MATERNAL AND INFANTILE MORTALITY DURING PARTURITION AND FOR SOME TIME SUBSEQUENT TO IT.

The subject of the preceding inquiry is certainly not without interest in a physiological point of view. Nor is it devoid of importance in a pathological and practical light. The results of the whole investigation show us with demonstrative force that the adaptation of the fœtus to the maternal passages in human parturition is, in general, so close and perfect, that a deviation in their relative size, of the slightest possible extent, is capable of altering immensely, when the subject is viewed on a large scale, the consequences of the process as regards both the immediate safety and life of the mother and infant, and their subsequent welfare. We may be hence led to see more strongly than previously the advantages attendant upon the presentation of the head of the infant in its most natural position, and consequently in its smallest given diameter, and the disadvantages accompanying any deviations in its presentation, seeing that all these deviations offer a larger circumference than the normal parietal case. The same inquiry illustrates well the importance of saving, and particularly in cases in any degree tedious, or in any slight malpresentation, the space of the pelvic passages as much as possible, by keeping the rectum and bladder empty, by carefully guarding against congestion and tumefaction of the soft tissues lining the pelvis, and by promoting, by all appropriate means, the dilatability of the maternal passages. We can easily, from the same data, understand how greatly the dangers of the mother and child are increased by organic contractions, however slight, in the pelvic passages and bones themselves, and by increased volume on the

[1] "The diseases of the nervous system," observes Mr. Farre, "are *twenty-three per cent* more fatal to males than females, *the chief difference arising from the diseases which affect children.*"—Registrar-General's *Second Annual Report*, Appendix, p. 4.

part of the infant, whether that increased volume be the effect merely of excessive growth or the result of actual disease.

The object of our investigation becomes one of still more practical moment when we consider it in relation to the extensive character of its operation and influence.

The importance of any cause of human disease does not so much depend upon the immediate intensity and danger of the morbid action which it is calculated to excite in single individuals, as upon the frequency and extent of its operation, and the consequent amount of its effects upon the general community. In this way a slight disease or slight cause of disease, which acts upon a great proportion of the population, may become as important in its ultimate and practical results as a malady of the most formidable character, provided that malady is much more narrowed and limited in its attacks. "The cholera," observes Quetelet,[1] "and the influenza are diseases which differ greatly from each other; the one is a dreadful scourge, which manifests itself in the most dreadful manner; the other, in its ordinary external appearance, resembles a catarrh or common cold; and yet the tables of mortality prove that, although the latter disease is not so deadly, it nevertheless, in consequence of its universality, and in consequence of the sufferings it causes, produces results nearly as extensively fatal as cholera. Facts serving to confirm this opinion may be found in the excellent work published by Dr. Gluge on the History of Influenza."[2]

The remark which we have applied to diseases, and the causes of disease, holds equally true with regard to morbid complications in midwifery and their causes. Those special states which, in obstetric practice, are seen to lead to some of the most formidable causes of difficult labour, such as tumours in the pelvis, malpositions of the infant, inertia of the uterus, etc., are certainly often most disastrous in their immediate effects, but yet, upon the whole, they are comparatively so rare in their occurrence as not individually to lead, upon a large scale, to consequences of so severe and fatal a character, as disturbing agencies of a far slighter, but far more general kind, such as that inconsiderable enlargement of the male over the female head, which we have been considering in the preceding pages. A few computations will best illustrate and enforce the truth of this abstract remark. These computations I shall found on the idea that the bases of calculation offered by the data of the

[1] *Natural History of Man*, p. 112.

[2] *Die Influenza oder Grippe*, u. s. w. Minden, 1837, 8vo.

Dublin Hospital are sufficiently correct to serve for a ground of analysis of other analogous statistical results. To avoid as far as possible any probability of great errors, we shall keep our calculations considerably within the limits that our apparent standards might seem to warrant.

With this explanation, let us proceed to inquire to what extent the cause of difficulty and danger during labour, which forms the topic of our present essay, fatally influences each single year in England, or during a succession of years, the results of parturition, as respects the fate both of the mother and infant. Some facts, recorded by Mr. Farre, in his admirable contributions to the different annual reports of the Registrar-General, will serve as matters of comparison on these points with the Dublin Hospital returns.

Number of maternal deaths referable annually in Great Britain to the influence of the comparatively great size of the head of the male infant.

In the returns of Drs. Clarke and Collins, we have reports in the Dublin Hospital of the sex of the child in 368 cases in which the mother died from labour or its consequences. In 231 instances the child was male ; in 137 cases it was of the female sex. The proportion of maternal deaths, after male and female births, was therefore as follows:—

Total deaths.	With male children.	With female children.	Proportion of males to females.
368	231	137	168 to 100

If we venture, then, to compute from these data, that out of 250 mothers that die in childbirth from parturition or its effects, 150 have given birth to males and 100 to females, as the above table would seem to show, then we have in every 250 maternal deaths an *actual excess* of 50 cases of loss of the mothers after male births, for which, for reasons which we have previously stated at length, we can find no other explanation than the greater comparative size of the male head, and we have already attempted to prove that this explanation is in itself logically and amply sufficient to account for the consequences which we have attributed to it. In other words, among every 100 parturient mothers that die, we have 40 perishing after producing female children, other 40 perishing after producing male children, and the remaining or additional 20 in the 100 perish-

ing also after the birth of males, but so far forming a regular and constant *excess* of 20 per cent of deaths in connection with male births, traceable to no other cause than the sex and consequent size of the infant. One in every 5 maternal deaths, or 20 in every 100, and 200 in every 1000, are so far the direct or indirect consequences of the greater dimensions of the head of the male infant. Now, at the present day in Great Britain, upwards of 3000 women die every year from childbirth or its immediate effects. Hence, according to the above computation, 600 of these 3000 cases,[1] as forming the *excess* of male over female births, are more or less immediately the results of the sex and size of the male infant. In Great Britain, therefore, the valuable lives of 500 mothers, to speak within the terms, are annually lost in childbirth through the influence and agency of the cause in question.

Number of infantile deaths occurring annually in Great Britain during labour, and referable to the sex and size of the male infant.

We have seen, under our fourth proposition, that in the Dublin Hospital there died, during the process of parturition, and probably as a consequence of the injuries to which they were subjected, 151 male children for every 100 females. According to the mode of argument followed in the preceding paragraph, there was thus an *excess* of 50 male deaths among every 250 children, or 20 in every 100, referable to the greater size of the head of the male infant. Further, we may take it for granted that, on a low computation, 1 in every 50 children born dies during labour, about 1 in every 25 cases being a still-birth. To be certain, however, not to overstep our limits, let us reckon only 1 in every 75 children to die during parturition, and 1 in every 5, or 20 per cent of those that thus perish, to be formed by that excess of the mortality of males over females which we can trace to no other cause than the influence of the greater dimensions

[1] During the four years from 1838 to 1841, there died in childbirth in England and Wales 11,722 mothers. In 1841, the last year of which the returns are yet published, 3007 women died in childbed in England and Wales.—*Fifth Annual Report* of the Registrar-General, p. 380. If to these we add 500 deaths as occurring in childbed in Scotland, we will be much within the limits in computing 3000 maternal deaths to take place annually in Great Britain from labour or its immediate consequences. I reckon 500 deaths as occurring annually in Scotland in childbed on the calculation which seems to hold in regard to England, that nearly 200 deaths happen every year from this cause in every million of the general population.

of the male head. In England and Wales about 500,000 births take place annually.[1] By the above computation more than 6500 of the offspring of these births die during labour, and one-fifth of that number are lost in consequence of the sex and size of the male child. In Great Britain, therefore, the lives of 1500 infants are annually lost in childbirth from the operation of this agency.

Number of infantile deaths occurring annually in Great Britain within the first year of life, referable to the influence of the sex and size of the male child during labour.

In 1841 there died in England and Wales, within the first year of life, 41,444 boys and 32,766 girls. There was thus an excess of 8678 deaths of male infants within the first year, and 3610 of this excess occurred within the first month after birth. In considering this subject under our seventh proposition, I have already stated our reasons for considering the excess in question of male over female deaths, in very early infantile life, as owing to the great injury sustained by the head and nervous system of the male child in its passage through the pelvis during delivery. I have further commented on the same subject in speaking of the excess of size of the male head and encephalon as the probable cause of the greater difficulties attendant upon male births. Under these points enough has been stated to show that a large proportion, if not the whole, of the remarkable excess of the male over the female mortality, which is observable for some time after birth, is traceable to the greater dimensions of the male head and encephalon, and their consequent greater compression and injury during delivery. Supposing these views to be perfectly correct, there die annually in Great Britain upwards of 5000 children within the first year after birth, whose death is referable to the influence of the sex and greater size of the male head during labour.

If we add together the three series of observations that have been stated under the preceding heads, the result is as follows:—*Upwards of* 7000 *deaths in all—namely, above* 6500 *of the deaths of*

[1] "In 1841, 512,158 births were registered; in 1840, 502,203; and in 1839, 492,574."—Registrar-General's *Fifth Report*, p. 8. It seems doubtful if all the births that occurred were registered, as this, like the other branches of registration, could not at once be made perfectly efficient. Certainly it is to be greatly lamented that there is no official return of the still-births. The omission is a most extraordinary one, and surely ought to be corrected.

infants during and after birth, and 500 *of the deaths of mothers in childbed occurring annually in Great Britain—are referable to the direct or indirect agency of the cause that we have been discussing, viz. the sex and larger size of the head of the male child.*

In using here the term *cause* in reference to the slightly greater size of the male head as the source of the results that we have above ascribed to its influence, it may be proper to state the precise meaning which we attach to this term. Amidst all the uncertainties of medical language, there is no phrase which has had more vague and contradictory significations attached to it. Except in the cases in which disease and death are produced by the immediate action upon the body of severe physical injuries, or strong chemical agents, it rarely or never happens that serious and fatal morbid actions are excited in the economy through the operation of one single morbific cause. In most, if not in all, other instances, a number of causes are found to have acted either in concourse or succession towards the production of the disease that may be present, and the effect to which it leads. According to the order which these several causes may occupy in the series or chain of antecedent sequences, and according, in some instances, to their supposed relative importance and intensity in the production of the existing morbid action, they are individually described by pathologists as accessory or determining—remote or immediate—predisposing or exciting—in relation to the disease that has been originated by their combined influence. Hence a cause which may be termed predisposing in one case may be more properly designated exciting in another, or the reverse, and consequently different authors often describe the same cause under opposite heads.[1] Further, it seldom occurs during the course of a fatal disease that the same cause which had especially excited the original malady continues, by the intensity of its own immediate action, to lead to the fatal result. An example will illustrate our meaning. All pathologists look upon excess in eating and drinking as a common cause of disease. If the body be

[1] For instance, Drs. Copland and Craigie, two of the latest British writers on practical medicine, speak of intemperance in food and drink under two different heads. "Amongst the most frequent *predisposing* causes to disease is," says Dr. Copland, "intemperance in food and drink."—*Dictionary of Practical Medicine*, Part ii. p. 562. Dr. Craigie enumerates the same morbific agency among his exciting or occasional causes of disease.—*Elements of the Practice of Physic*, p. 18. Dr. Williams, again, describes excess of aliment among his exciting causes of disease, and habitual excess in stimulating drinks among his class of predisposing causes.—*Principles of Medicine*, 1843, pp. 9 and 24.

debilitated by previous morbific agencies, a fit of intemperance may suddenly excite in it some serious and deadly morbid action, as extensive effusions or inflammation, severe fevers, etc., and thus act as an *exciting* cause of these diseases; or when the powers of the constitution happen at any time to be impaired by intemperance, the application of an excess of cold or heat may lead to similar consequences, and then the cause we are considering (the intemperance) would be regarded as a *predisposing* one. Further, it rarely happens that intemperance in eating or drinking leads to death by the mere excess of their own action and influence on the body. Few men, in other words, die of direct gluttony, or direct intoxication; but many die from intemperance in eating and drinking, leading directly or indirectly to a variety of maladies, such, according to Dr. Copland, as "plethora, inflammatory complaints, functional and organic diseases of the stomach, liver, and bowels, gout, apoplexy, paralysis," etc.[1]

The view which we have stated as generally taken by pathologists with regard to intemperance as a cause of disease and death, applies exactly to the greater size of the male head as a cause of the greater number of complications and casualties connected with male births. In some instances this excess of size acts as a predisposing cause to the accidents and diseases that are consequent to it, and, without its antecedent or concurrent agency, these accidents and diseases would not be produced. In other instances, it acts as a determining or exciting cause of the morbid conditions and complications resulting from its operations. We will take an illustrative example from an accident which we have already spoken of in a previous page, viz. rupture of the uterus. When rupture of the uterus occurs in a patient who has already borne a large family, and where the uterine parietes are, from some pre-existing disease, much more weak and lacerable at one part than another, the greater delay and difficulty of the labour in connection with the larger-sized male head may give rise ultimately to the complication in question, when the shorter and more easy passage of a smaller fœtal head would not have led to the same disastrous consequence. Here the previously diseased state of the uterus acts as the predisposing, whilst the larger size of the male head acts as the exciting or determining cause of the lesion. On the other hand, when rupture of the uterus occurs in a first labour in consequence of the larger size of the male head calling forth a morbid and inordinate degree of uterine contraction

[1] *Medical Dictionary*, Part ii. p. 562.

for its expulsion, we have this inordinate uterine contraction acting as the exciting or determining cause of the injury, and the excess of size of the male head standing now in the relation of the predisposing cause to it. Further, like other pathological causes, the excess of size of the male head does not so often lead to accidents and death by the mere influence of its own intensity, or by the effects of direct compression upon the maternal passages or infantile head, as by leading to the supervention and excitement of various other formidable and fatal complications, such as morbid delays in the labour demanding instrumental interference, eclampsia, post-partum hemorrhage, puerperal fever, etc., on the part of the mother—and convulsions, nervous and inflammatory diseases, etc., on the part of the infant.

Under the signification and reservations which we have thus stated, we repeat that the greater size of the male fœtal head is the more or less immediate *cause* of a large number of those maternal and infantile deaths that take place in connection with labour, or as a result of that process. In illustration of this remark, I shall venture to add another observation—one which may at first seem sufficiently startling to those who have not practically directed their attention to the subject, though it is but a simple and direct deduction from the facts we have so imperfectly brought forward in the preceding pages. It is this :—

The official returns of the mortality of England and Wales have only, as yet (1844), been collected for somewhat upwards of seven years, viz. from 1st July 1837 to the present date. If the calculations we have already given are accordant with truth (and we believe them to be much within the limits), there have been lost in Great Britain during that limited period, as a consequence of the slightly larger size of the male than of the female head at birth ABOUT 50,000 LIVES, INCLUDING THOSE OF ABOUT 46,000 or 47,000 INFANTS, AND OF BETWEEN 3000 AND 4000 MOTHERS WHO HAVE DIED IN CHILDBED.

TRANSVERSE PRESENTATIONS.[1]

At this Meeting I propose to offer a few observations on the instance of transverse presentation and turning, which you witnessed in the Maternity Hospital two days ago. First of all, allow me to

[1] Part of a Clinical Lecture, reported by Mr. C. D. Arnott. See *London and Edinburgh Monthly Journal of Medical Science*, February 1845, p. 109.

read to you the case as it has been reported by my excellent friend Dr. Martin Barry.

"Christina Anderson, aged 28, married—third pregnancy—last catamenia in the beginning of March, continuing for two or three days—time of quickening uncertain.

"On the morning of Saturday, 7th of December, had a fall, in which the left hypochondrium was violently dashed against the corner of a large stone; says that she did not feel the movements of the child for longer than a day or two after this. On Tuesday the 17th —ten days afterwards—the child, when born, presented the separation of nearly the whole cuticle, with sero-sanguinolent infiltration of the scalp, and a state of looseness of all the cranial bones. The abdomen was swollen, and on laying it open, the spleen was found much enlarged, and patches of coagulable lymph were seen on its peritoneal surface; similar patches were present on the iliac and pelvic region connecting the peritoneum of the abdomen with that of the intestines; other portions of a similar inflammatory effusion were scattered over the intestines, more especially in the lower part of the abdomen.

"Labour commenced on Monday, 16th of December, and was completed in seventeen hours. The membranes ruptured twelve hours before the full dilatation of the os uteri.

"During the labour the patient was bled, and had an ounce of antimonial wine exhibited in ℥ss doses, to promote the dilatability of the cervix uteri. Shortly before turning, ℥i of laudanum was exhibited, in order to moderate the uterine contractions, and facilitate the process of turning.

"The presentation was the right shoulder with the cord, and the child was removed by turning and extraction. This was performed by Professor Simpson, who, observing from the feet and legs, when they had been drawn down, that the position of the pelvic extremity of the child corresponded to the third position of the head with the toes pointing forwards, stated that the body as it came into the world would present a corresponding movement of rotation—a movement forthwith seen by the writer and several others who were present. The head was then born in the second, or right occipito-cotyloid position."

Most of you are aware that we cannot, except in the rarest cases, leave instances of shoulder-presentations to nature. Experience abundantly shows us, that if we do not offer the required aid in

these presentations, the woman, in general, either dies exhausted from the long-continued but fruitless efforts of the uterus to empty itself of its contents; or the organ, by the violence of its own contractions, lacerates its own structure, and thus establishes one of the most fatal complications to be met with in the practice of midwifery, namely, rupture of the uterine walls. In these presentations, therefore, interference is imperatively required, and this interference consists in so far altering the morbid position of the infant, that, instead of allowing it to remain with its long axis across, or at right angles to, the long axis of the uterus, we introduce our hand, and bring down to the os uteri one of the two extremities of the *ovoid* mass of the child (the child in the latter months being, as you know, folded up into an irregular ovoid form), in order to make the long axis of the body of the infant and the long axis of the body of the uterus parallel to each other. For this purpose, we may bring down either the cephalic or the pelvic extremity of the infant.

The cases are few in which it is proper and possible to bring down the head of the child to the os uteri, or, in other words, in which we can and should perform what is termed *cephalic* turning or version.

In almost all cases, but especially in one like Anderson's, with the child dead, and the passages well dilated or dilatable, we bring down the pelvic extremity of the infant, and so far change the presentation from one of the shoulder or arm into one of the breech, feet, or knees.

Many modifications of this last operation—*podalic* version or turning, as it is termed—have been proposed, and different varieties of it are advocated by different practitioners. By some we are advised, in all cases, to bring down *both* feet of the infant. Others, again, assert that to bring down *one* is always sufficient. Some advise a foot or feet; others one or both knees. Let us inquire what method would be the most simple and most practicable in a case like the one before us.

I would first, however, remark, that in turning, in any case, where the membranes are still fortunately entire, the female passages dilated, and the fœtus perfectly mobile in the liquor amnii, it matters, I believe, little whether we seize one or both feet, or one or both knees. All these parts are, under such conditions, so easily reached, and the whole operation of seizure and version of the child is then so simple, that it is almost needless to lay down set and formal rules (as some authors have done) for the exact part of the child

which you should seize, and the exact mode in which you should seize that part. There is so much room to turn, as the child still floats in the liquor amnii, that, if you can seize *firmly* almost any part of one or both of the lower extremities with the introduced hand, you will readily effect your purpose. The flexure of the knees affords a firmer and better hold than the foot or feet, and is hence probably preferable. It is, however, I repeat, sufficient to seize firmly any of these two parts, whichever of them first comes within your reach.

But the operation of version, in a shoulder or arm presentation, becomes a much more difficult, delicate, and dangerous operation, when you require to turn, as in Anderson's case, with the waters already evacuated, and the uterus tonically contracted, and folded around the body of the child. Under such circumstances, we require to know, and to study beforehand, the easiest method of operating for ourselves, and the most safe mode of operating for the mother.

Let us consider, therefore, what method of turning is the most simple, and the most practicable, under such conditions as I have just stated; and first of all let us inquire—

SHOULD WE SEIZE BOTH FEET OF THE INFANT?

You see this method of procedure represented in the plates before us of Moreau, and it is a mode which is strongly inculcated by some of our latest authorities in midwifery. "Never be content," says Dr. Lee, in his lately published lectures on Midwifery, "never be content with one foot, when it is at all possible to grasp both." In most cases, I hold this method to be improper and unjustifiable, because it is almost always more difficult to seize both extremities than to seize one; because one is quite sufficient for our purpose, and more safe for the life of the mother; and because by pulling at one extremity, when pulling does happen to be required after the version is accomplished, we more perfectly imitate the natural *oblique* position and passage of the breech of the infant, than when we drag it down more directly and more upon the same plane, by grasping and dragging at both limbs equally. The infant also assuredly incurs less risk of impaction of the head, and above all, less chance of fatal compression of the umbilical cord, when the os uteri and maternal canals have been dilated by the previous passage of the breech, increased in size by one of the lower extremities being doubled up on the abdomen, than when both extremities being seized and

extended, these same passages are more imperfectly opened up by the lesser-sized wedge of the breech alone.

Notwithstanding, however, the greater difficulties, and consequently the greater dangers attendant on the operation, when we search for and grasp both lower extremities, instead of one, it is still so dogmatically laid down as a rule by most obstetric authorities, that many practitioners seem to deem it a duty not to attempt to turn the child without having previously secured both feet.

About two years ago, I was sent for by an accoucheur, enjoying a deservedly extensive practice, in order to assist him in the operation of turning in such a case as Anderson's. He had introduced his hand, and brought down one foot into the passages. For a long time he had been attempting to re-introduce his hand into the uterus, for the purpose of seizing and bringing down the remaining foot. His continued efforts, however, had proved perfectly useless, and he requested my attendance under this supposed difficulty. Without endeavouring to effect what he had laboured to accomplish —namely, the seizure and extraction of the retained extremity—I contented myself with dragging at the one foot already protruded, and with it alone pulled down the child without difficulty.

In few or no cases of turning is it proper or requisite to bring down both extremities, unless in the complication of turning under rupture of the uterus. In that case, but in that only, ought we to follow at once this procedure—and here we follow it, because, if we left the other extremity loose in the uterus or abdomen, it would be apt to increase the lesion in the walls of the organ, if it happened to get involved in the aperture, or impacted against its edges. In some very rare instances in which, after version by one leg has been effected, and immediate delivery is necessary, the cervix and os internum occasionally contract so forcibly and strongly upon the protruded limb, whenever we drag upon it, as not to allow of a sufficient amount of traction being applied to this extremity without fear of lacerating its structures. In such cases also it may be well to attempt to repass the hand to secure the other extremity, for then, by pulling at both extremities together, we incur less chance of injuring them than if we applied the same required amount of force to either of them singly.

SHOULD WE SEIZE ONE EXTREMITY ONLY?

From what I have already stated, you know my opinion, as to this being the proper method of proceeding in almost all cases of

difficult turning. The method was long ago spoken of by Portal; and within the present century, Hoffmann and Joerg in Germany, and my friend Dr. Radford in this country, have severally written on the subject, and upheld, that in *no* case of turning ought we to lay hold of more than one extremity, for the purpose of effecting the version of the infant. I have just pointed out what I conceive to be two—perhaps the only two—exceptional conditions to this general rule.

Another question meets us. Supposing we intended, in turning, to bring down the pelvic extremity of the ovoid mass of the child, *what part of that extremity* should we lay hold of in order to make it the presenting part at the os uteri?

Some accoucheurs have thought, that if we seized and brought down the *breech* of the infant, it would be the safest mode of turning. This method, however, presents so many disadvantages, that it seems now entirely rejected from practice as a common mode of performing version; for it is difficult to reach up to the breech of the child—and it is difficult to take a sufficiently firm hold of it when you have once reached it—and it is difficult, when once you have taken hold of it, to perform the evolution or version of the child with such a purchase.

We may limit, then, the part which we ought to lay hold of to the lower extremities, and I have already told you that I believe one extremity sufficient. The remaining question, therefore, is this—What part of that extremity should we seize upon?

SHOULD WE TAKE HOLD OF THE FOOT OR THE KNEE?

I believe the seizure of the knee to be preferable in most, if not in all cases, to the seizure of the foot, or rather, as it should be more correctly stated, to the seizure of the ankle of the child. I speak, you will recollect, of turning in cases of shoulder or arm presentation, in which the liquor amnii has been for some time evacuated, as in Anderson's case, and the uterus, by its tonic contraction, has clasped itself around the body and head of the child. Under such circumstances, it is an object of importance not to be obliged to introduce our hand farther than is absolutely necessary into the cavity of the uterus, because the contraction of the organ, in many cases, opposes its introduction, and the forced introduction of it is apt to produce laceration.—It is an object also of equal moment to attempt to turn by a part which produces as little change as possible

in the figure and form of the infant; because, if we thrust any of the angulated parts of the child against the interior of the contracted uterus, we would also thus be still more liable to produce rupture of that organ.—Now, holding these points in view, it appears to me that the turning of the child by seizure of the knee presents several decided advantages over turning of the child by seizure of the foot. For—

First, The knee is more easily reached. As we slip our hand along the anterior surface of the protruding arm, and along the anterior surface of the thorax of the child, we always, if the attitude of the child has not been altered by improper attempts at version, or very irregular uterine action, find the knees near the region of the umbilicus of the infant—the lower extremities, as you are aware, being folded up in utero so that the knees are brought up to that part, and the legs flexed upon the thighs in such a manner that the heels and feet lie nearly in apposition with the breech of the child. To seize a foot, therefore, we would require to pass our hand about three inches, or, in fact, the whole length of the leg, *farther* than we required to do in order to seize a knee.

Secondly, The knee affords the hand of the operator a much better hold than the foot. By inserting one or two fingers into the ham or the flexure of the knee, we have a kind of hooked hold which is not liable to betray us. Every one, on the other hand, who has turned by the foot or feet, knows how very apt the fingers are to slip during the required traction, and how much in this way the difficulties of the operation are sometimes increased.

Thirdly, We produce, I believe, the necessary version of the body of the child more easily by our purchase upon the knee—because thus we act more directly on the pelvic extremity of the infant's spine, than when we have hold of a foot.

Fourthly, Turning by the foot appears to me to endanger greatly more the laceration of the uterus than turning by the knee. The reason of this is sufficiently evident. When we turn by the foot we have to flex the leg round upon the thigh, and thus at *one* stage of the operation, and during one part of the flexion of the leg, we are obliged to have the leg bent to a right angle with the thigh, and the foot of the infant thus projected and crushed against the interior of the uterus. You see this when, on the infant before me, I seize hold of the foot, and turn it round from its position at the breech, till I bring it up to the shoulder, the part which we are supposing to present at the os uteri. You can easily thus perceive (as in the woodcut) that when the leg of the child is thus brought round, it

must rasp and scratch, if I may so speak, along the interior of the contracted uterus, and endanger to a fearful degree the laceration

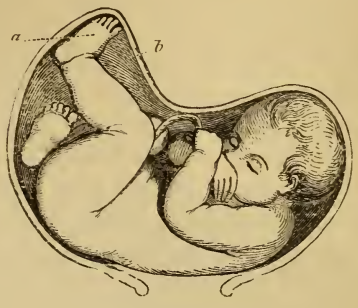

Fig. 5.

of the organ. It is needless to say how much this danger is increased when, after having brought down one foot, we pass again our hand and attempt to bring down a second foot, as is recommended by some authors, for thus we only double the danger of laceration of the uterus, from the forced and obstructed passage along its interior of this other extremity.

One point remains for our consideration. Granting that it is proper to seize a knee, I think it a matter of the very first moment to know

WHICH KNEE SHOULD BE SEIZED?

On this point you will find no directions in any of our modern obstetric works, British or foreign, so far as I know them; and yet I believe the secret of turning with facility and safety in such a case as Anderson's—with the waters evacuated and the uterus contracted—depends upon the knowledge of which of the two lower extremities of the infant should be seized. If we turn with one of the extremities—and whether the foot or the knee—it should be the foot or knee of the limb on the *opposite side of the body* to that which is presenting. Thus, if the right shoulder or arm presents, we should take hold of the left knee or foot; and if the left arm or shoulder presents, we should take hold of the right knee or foot. I repeat, that I believe this point to be one of the most essential importance; and the reasons for the rule are simple.

In bringing down the fœtus in the operation of turning, we may and should produce two kinds of alteration in its position and figure. Thus, we may bend or flex the body forwards upon the *transverse* axis of the trunk; and we may rotate or turn the body

round upon the *longitudinal* axis of the trunk. If we merely flex it, the operation of version will be one of difficulty; if we both flex and rotate the trunk at the same time, the operation will be one of comparative facility. By merely flexing the body upon its transverse axis, we are liable to bring down one of the lower extremities, whilst we do not displace the upper extremity, which is primarily presenting at the os uteri. If we *both* rotate and flex the body—that is, turn it both on its transverse and longitudinal axes—at the same moment, whilst we bring down the pelvic extremity of the child, the turning of the body of the infant carries away from the os uteri the part originally presenting.

Many of you must be acquainted with the fact, that obstetric authors have proposed various methods of removing away from the cervix uteri the presenting arm or shoulder, in order to allow of more space for the part which is brought down, and to produce the necessary evolutions of the child. Thus some recommend the presenting part to be pushed up before we seize the feet; others advise the foot to be seized with one hand, and the presenting part to be pushed up with the other; and others again counsel us to bring down one or both feet, secure them with a tape (as you see in a plate of Moreau), and, whilst pulling with this tape, to introduce the hand, after the lower extremities are brought down, for the purpose of pushing up the presenting portion of the upper extremity.

All these rules and complications are at once avoided by following the principle that I have just stated to you, of bringing down, whenever it is possible, the knee opposite that of the presenting arm or shoulder. When we do this, by carrying the knee diagonally across, if I may so speak, the abdomen of the child to the os uteri, we both, as I have said, *flex and rotate* at the same time the trunk of the infant, and in doing so, the semi-rotation of the trunk inevitably carries up the presenting arm, in proportion as the knee which is laid hold of is pulled down by the operator. I would add this, as another of the advantages of turning with one extremity, for if we pulled down both knees or both feet, or the foot or knee which was nearest to us, we should produce in many instances mere flexion of the body, *without* that rotation of it which is necessary to carry up and out of the os uteri the presenting part of the infant.

I have insisted upon the advantages of taking hold of the knee that is highest and farthest from you, and believe this to be a matter of the very first moment. Now, it may appear to some of

you that it would be more difficult to seize this knee than the knee of the side corresponding to the presenting arm; but if you reflect for a moment you will see that this difficulty is more imaginary than real. Both knees of the child, as the infant lies folded up in utero, are generally in juxtaposition, and lying upon the abdomen of the infant, near the umbilicus. If, therefore, in passing your hand into the uterus, you insinuate it, as you ought to do, along the anterior surface of the thorax and abdomen of the child, you come in contact with both knees at the same time (see the wood-cuts). And the rule which I would give you is this, that instead of hooking your finger or fingers into the flexure of the lower or nearer

Fig. 6.

knee (*a*), you hook them instead into the flexure of the upper, more distant, or opposite one (*b*). Both are so far, in general, equally near, or equally distant, and you seize the one or the other, according as you take care to turn your finger so as to hook it into the flexure of the lower or the flexure of the upper. It has been strongly objected by some authors to the mode of turning by the knee or knees, that we cannot with the hand in utero make a sufficient

DIAGNOSIS BETWEEN THE KNEE AND THE ELBOW.

It is averred that the operator is exceedingly liable to mistake the elbow of the child for the knee, and thus to bring down the opposite arm instead of lower extremity—a result that would certainly render the case only the more complicated. I believe, however, that we might be, and are, equally liable to confound the

foot with the hand, and thus lead to the same consequence, while the following simple rule will always enable you to escape the error and danger of mistaking an elbow for a knee :—Suppose the child to be lying, as it does, with its extremities doubled up in the uterus, the elbow and knee may be always distinguished from each other by the *opposite directions* in which they point. You have the salient angle, convexity, or rotundity of the knee, always looking upwards towards the upper or cephalic extremity of the child, whereas you have the salient angle, convexity, or rotundity of the elbow, always looking towards the lower or pelvic extremity of the infant. A glance at the sketches will show you this. Hence, if we know the position in which the infant is lying (and this we always do, for other reasons, ascertain previous to commencing our operation), we may, by attending to this single fact, easily distinguish in all cases a knee from an elbow.

There is one point worthy of every attention in regard to the operation we have been considering, which I have not yet alluded to. It is this, that—particularly in cases of difficulty—you require to

USE BOTH YOUR HANDS FOR THE OPERATION OF TURNING.

In making this observation, I mean that whilst we have one hand *internally* in the uterus, we derive the greatest possible aid, in most cases, from manipulating the uterus and infant with the other hand placed *externally* on the surface of the abdomen. Each hand thus assists the other to a degree which it would not be easy to appreciate, except you yourselves were actually performing the operation. It would be extremely difficult, if not impossible, in some cases, to effect the operation with the single introduced hand ; and in all cases it greatly aids and facilitates the operation. The external hand fixes the uterus and fœtus during the introduction of the internal one ;—it holds the fœtus *in situ*, while we attempt to seize the necessary limb or limbs, or it assists in moving those parts, when required, towards the introduced hand ;—and it often aids us vastly in promoting the version or evolution of the body of the child, after we have seized the part which we search for. Indeed, this power of assisting one hand with the other, in the different steps of the operation of turning, forms the principal reason for introducing, as I have sometimes done, the left as the operating hand into the uterus—for thus we can, by passing the right hand between the thighs, and over the abdominal surface of the uterus

(the woman lying on her left side), have more perfect control over the child by our external manipulations with the latter hand. Besides, the left hand, when the patient is in the position I have described, more readily adapts itself to the configuration and axes of the pelvis. If we introduce and turn with the right hand, it is more awkward and difficult to manipulate the abdominal surface of the uterus with the left.

The mode of turning which I have recommended to you was followed in the case of Anderson. When I was first called to see her, all things were in a condition suitable for undertaking the operation. The membranes had burst some hours previously, when the os uteri was still comparatively rigid. It is, no doubt, a matter of moment to be able to turn *before* the waters have escaped, because, as I have already stated to you, the operation is then greatly more simple; but when the membranes do break—as in the case before us—with the os uteri still undilated and undilatable, we must wait with patience, and employ such measures as tend to relax that part. In the present instance, bloodletting was had recourse to for this purpose, and antimony exhibited. A short time before I saw her, Dr. Barry had very properly given her a large dose of opium, in order to moderate the spasmodic or clonic contractions of the uterus, so as to admit of the more easy performance of the version of the child. The os uteri was quite dilatable when I reached the hospital, but the tonic contraction of the organ was so great that I feared there might be some delay and difficulty in the introduction of the hand, and evolution of the child. Such, however, was not the case to the degree anticipated, and the version was accomplished in two or three minutes.

The child was lying with its head towards the right iliac fossa, and its pelvis towards the left. The face, abdomen, and extremities of the infant were looking forwards. (See Fig. 6.) I therefore, as we always do in such cases, passed up my hand between the anterior or pubic surface of the uterus and the infant, in order to reach more easily the knee which I wished to seize.

As to the place or side where we ought to pass our hand—that is whether between the infant and the pubis, or between the infant and the sacrum—the rule is simple and evident. We pass our hand, as in the case before us, between the pubis and the infant, when we know the extremities of the child are looking anteriorly. We pass our hand between the sacrum and the infant, in those other cases in which we know the limbs of the child to look posteriorly. We do

so for two reasons—*first*, because there is always the greatest space for the introduction of the hand on that side of the fœtus to which its face, abdomen, and angulated extremities look; and, *secondly*, it is only, of course, on this side of the fœtus that we can find and secure the lower extremities in order to produce the required evolution and extraction. Dr. Lee lays it down as one of his "two most important rules" in turning, that, however the trunk and extremities of the child may be situated—that is, whether the extremities look anteriorly or posteriorly—you ought "to pass up the hand between the *anterior* and shallow part of the pelvis, and the presenting part of the child." If the back of the infant were turned, as it sometimes is, to this "anterior or shallow part," it would be impossible, by any search in that situation, to get hold of one or other of the legs of the child, which are situated in the very opposite part of the uterus, and on the opposite side of the body of the fœtus; —and if the feet were thus really seized, they would be brought over the back of the child, and the spine so far greatly endangered. But Dr. Lee's rule is so very obviously erroneous, and the result of some misconception or disregard of the mechanism of transverse presentation and turning, as not to require any formal refutation. His second important rule, "that when one hand is rendered powerless by the pressure of the uterus, you ought to withdraw this hand, and replace it by the other," will doubtless be in many cases, I fear, an unavoidable result of the mismanagement advocated by the first —and is rarely if ever required when you employ the proper hand at once. And every new and unnecessary introduction of the hand must be reprobated, as inflicting a new and additional source of danger upon the patient, and hence should be avoided as far as possible.

You saw, in this instance, what are the usual preliminary measures adopted in connection with the operation of turning. We kept, as I showed you at the time, the patient placed upon her left side, with the trunk of her body situated across the bed. The right knee was raised by the hand of an assistant, and the uterus kept fixed and steady by pressure on the external surface of the abdomen. In preparing the hand and fore-arm for the operation of turning, these parts were perfectly uncovered, and everywhere anointed with lard, with the exception of the palmar aspect of the hand and fingers. These latter parts require always to be kept free, in order to secure a proper hold of the presenting part.

After cautiously passing the hand into the uterus, along the

anterior surface of the protruded arm, I glided it between the anterior surface of the thorax of the child, and the anterior wall of the uterus, laying it flat during one slight pain that supervened, and insinuating it onwards immediately afterwards, till I reached the two knees lying in the umbilical region of the infant. I passed one finger into the flexure of the upper knee, and thus got sufficiently firm hold of that part, without displacing the lower extremities to any extent. Assuring myself, as we always do in the process of version of the child, of the *complete absence* of all clonic contraction of the uterus, I easily turned it round with the purchase I had, and brought down the left lower extremity, the infant making a complete rotation during its evolution, as we shall see immediately from the direction of the toes, abdomen, and face.

We thus, you observe, make the version or evolution of the child during the *absence* of any uterine pain, but, after bringing down the extremity, should any further assistance be required towards the extraction of the child—it must, I beg you especially to remark, be made not during the absence of uterine contractions, but during the *presence* of them. In most cases, indeed, after the version is performed, we allow the uterine contractions themselves to expel the infant, but it was not necessary to wait in such a case as Anderson's, the pains being trifling, and the child being dead. I therefore pulled gently at the protruding leg during each subsequent contraction, and ultimately extracted the head from the pelvis by a purchase obtained by passing two fingers of the right hand over the neck of the child, and introducing two others into its mouth.

You will recollect that, in Dr. Barry's report of the case, as I read it to you, he states an interesting and important fact with regard to the evidence which it afforded of the

NATURAL MECHANISM OF LABOUR IN FOOTLING PRESENTATIONS.

In this instance, as occasionally happens in pelvic presentations — both spontaneous and artificial — we found the toes looking towards the pubis, from which we knew that the face and chest of the child must be turned in the same direction—and I stated to the gentlemen present, that this would not interfere with the process of extraction of the infant, for the child, during its farther transit, would rotate round with its toes, etc., towards the nearest sacro-iliac synchondrosis, and not require any manipulation on our part to make it come out in that—its proper and most easy position.

This is a subject I would wish particularly to impress upon your minds, for you will find it stated in almost every text-book, that in all pelvic presentations, whether they occur spontaneously, or whether they are artificial, as in cases of turning, it is proper and necessary for us to rotate so far the body of the child, that its toes, and hence its face, should be turned towards the posterior aspect of the pelvis, or, as some more properly advise, towards the nearest sacro-iliac synchondrosis.

We are recommended, for instance, by Dr. Hamilton, to observe, as soon as the child is born as far as the knees, whether the toes point forwards or not—and if they do point forwards, as they did in Anderson's case, we are further directed immediately to turn the child round, so that they may look to the nearest sacro-iliac symphysis.

But no such manipulation is required as a general rule in spontaneous pelvic presentations, and none in artificial pelvic presentations, especially when you bring down only one extremity. In all the cases which I have watched, the infant, as in Anderson's, during the passage of the trunk, rotates and assumes this position itself, without any interference on our part, and upon the principle which I stated to you at lecture this morning, when speaking of similar rotations in head cases, of the mutual physical relation of the child and pelvis, the former turning within the latter, as the helix of a partial screw will partially turn within its nut.

In natural or spontaneous pelvic presentations, this rotation that I allude to occurs normally and naturally during the passage of the trunk; and that the rotation itself is a mere physical result, and independent of any vital actions on the part either of the child or mother, is proved to demonstration by an experiment which I have several times taken occasion to make—namely, that of dragging by one foot a dead fœtus through the pelvis of a dead mother. If, at the commencement of this experiment, we place the child with its toes, abdomen, and face, looking forwards, we shall find that, as the trunk passes through the pelvic cavity, it regularly rotates round, so that these parts come to present at the nearest sacro-iliac synchondrosis.

Now, what holds good in regard to the mechanism of natural pelvic presentations, holds good also in regard to the mechanism of artificial pelvic presentations, or of those which we make in the process of turning. In artificial, as in natural, footling and breech cases, we ought, I believe, to discard in a great measure from our

mind any necessity for interfering, so as to turn the infant from one position to another as it passes through the pelvis; for in 9 out of 10, or in 19 out of 20 cases, it will sooner or later assume for itself the easiest and best position for the passage of the head—namely, with the face turned towards the nearest sacro-iliac synchondrosis. This will almost invariably be the case if we do not hurry the extraction of the child by pulling at the protruded extremities, or if we pull merely by one—and that the one *nearest* the pubis. *By dragging, when it is required, at the limb of the child lying next the pubis, and at this limb only*, we pull down the pelvis of the infant obliquely, so far imitating the presentation and easy transit of this part of the body in normal pelvic cases, where the anterior ischium is always the lowest; and by the same means we promote the necessary rotation of the child's body, while we should prevent it, on the other hand, by dragging at the sacral or posterior limb—or by grasping and dragging simultaneously at both.

All obstetric authors seem to me to err in advising direct interference, for the rotation of the child in artificial pelvic cases, to be made by the hands of the practitioner. In speaking of the duties required in such circumstances, even my friend Dr. Rigby (who, in other points, inculcates such sound and excellent doctrines with regard to the mechanism of parturition and non-interference with it on the part of the attendant), observes, "the uterus must be emptied as slowly as possible, and the anterior part of the child *must* be directed more or less backwards." It will, as I have stated to you, be directed more or less backwards by the physical relations between its own trunk and the interior of the maternal pelvis, so as to require no such adaptation to be attempted by any intermeddling on our part. A simple experiment will convince you that this will occur. I have already stated to you, that in repeated experiments made by dragging a dead child by one limb through the pelvis of a dead mother, I have seen the rotation spontaneously take place. But it will even take place, if I perform the same experiment much more rudely, by attempting to drag the leather fœtus before us through the bony cavity of this dry pelvis. If I place, thus, the fœtus with the feet in the pelvis, and the toes directed towards the pubis, or, as is the case in nature, somewhat obliquely to one side of the pubis, say towards the right foramen ovale, and drag the fœtus through by pulling only at the anterior or pubic limb of the child, it turns, you observe, spontaneously, as the trunk passes through the pelvis, so that the face looks at last

to one ilium, or even backwards towards the nearest, or right, sacro-iliac synchondrosis; and this extent of rotation will more surely occur if the right arm chance to pass into the unoccupied space of the left sacro-iliac symphysis, or rather if that arm be removed so as not to prevent the rotation of the shoulders and head. The curious and illustrative experiment I have just shown you, was first pointed out to me by my esteemed friend Dr. Ziegler.

SPONTANEOUS EVOLUTION OR EXPULSION OF THE FŒTUS.

DECAPITATION AND EVISCERATION IN TRANSVERSE PRESENTATIONS.[1]

Case I.—Dr. Simpson described a case of spontaneous *pelvic* evolution which he had seen in the second child of a twin case. He was called in about an hour after the first child was born, when the arm and chest of the second child were already protruding through the vagina, and the process of its spontaneous expulsion going rapidly forwards. It was born dead by the unassisted efforts of the uterus, in the course of a few pains, and by the usual mechanism. He further alluded to a case some years ago attended here by Dr. Cowan, the arm presenting, and the breech at last passing first.

Case II.—Dr. Simpson subsequently stated another case of its occurrence. The patient was under the charge of a midwife. Mr. Alexander, who was called in, requested Dr. S. to see the case, with the view of turning the child. The mother had already borne four children. The present pregnancy had advanced to between the seventh and eighth month. When born, the child weighed 3 lbs. 9 oz., and measured 17½ inches in length. The labour commenced at 8 A.M., but made very little progress till the afternoon. At 7 P.M., when Dr. S. arrived, the shoulder of the child was pressing deeply into the pelvis. The rectum seemed loaded; and they left the room for a short time, in order that the nurse might empty the bowel with an enema, before turning was practised. On being recalled, they found the pains strong, and the *body* of the child beginning to press down through the pelvic brim—indicating the commencement of the usual process of spontaneous evolution. Dr. S. remarked that this peculiarity and change in the presentation had taken place during the ten or fifteen minutes since they had left the patient—the fœtus had made a slight turn upon its long axis, so that it presented much more of the back, and less of the side, than before, the shoulder still, however, maintaining its deep position in the cavity of the pelvis. The child's body came down, in other words, not with the spine or trunk bent and doubled up laterally, but bent and doubled up in a great measure anteriorly. The anatomical structure of the spinal column admitted far more easily of this anterior flexion than of lateral flexion. Was this a common turn or rotation in the mechanism of spontaneous expulsion? If so, did the want of it delay or prevent the process of spontaneous expulsion in some

[1] See Proceedings of Edinburgh Obstetric Society, March 10, 1847, in *Edinburgh Monthly Journal of Medical Science*, May 1847, pp. 869-870; and Session viii. in *Ibid.* February 1849, p. 560.

cases? And could it be imitated by art so as to allow the process to go on in appropriate cases? After being forced into this new position, the child was very quickly expelled by the natural efforts, and according to the common mechanism of spontaneous evolution. As usual, it was born dead.

He had also met with two cases of *cephalic* spontaneous evolution or expulsion, the arm presenting, the head and thorax becoming impacted together in the pelvis, and the head ultimately passing out before the lower part of the body. One of these cases occurred in the Maternity Hospital; the other he saw in consultation with Dr. Skae.

General Deductions regarding spontaneous Evolution.

1*st.* Spontaneous evolution in transverse presentations was not so rare as some authors averred, and it would probably occur oftener if proper and timely assistance were not rendered.

2*d.* Under some circumstances, arm and shoulder cases should probably be left to be expelled by the mechanism of spontaneous evolution, assisting, if necessary, this mechanism by art.

3*d.* This ought to be our practice, if, in an arm or shoulder case, the chest and trunk of the child be *already* thrust down into the cavity of the pelvis; for to turn under such a complication, and with that object attempt to push back the body of the child from the cavity of the pelvis into the cavity of the contracted uterus, would necessitate the redilatation of the uterus, and hence, in all probability, produce a rupture of its coats.

4*th.* If the process of spontaneous evolution failed, two operations had been recommended to effect delivery, viz. evisceration and decapitation; and they had always been described as applicable to the same set of cases; but they were individually applicable in two different sets.

5*th.* *Evisceration* was only applicable to cases of *pelvic* spontaneous evolution, demanding operative interference; and *decapitation* principally applicable to cases of *cephalic* spontaneous evolution.

6*th.* Of course in all common transverse presentations seen before the body and bulk of the infant was doubled and thrust down into the cavity of the pelvis, and while it was still in fact in the cavity of the uterus, *turning* was the proper practice, and to wait for the prospect of spontaneous evolution would be utterly wrong; and—

7*th.* A child of the common size would never, in a transverse presentation, be forced and doubled down into the cavity of the

pelvis, unless the mother's pelvis were large in its dimensions; and hence, when the process of spontaneous evolution is found in an *advanced* stage, it is almost a certain sign that the pelvis is of such measurements as to give a chance of its completion.

Of the two preceding operations, evisceration and decapitation, the former is generally extremely tedious, an hour or more being usually necessary:—1. To empty the contents of the thorax and abdomen; and 2. To drag down the breech with the crotchet. Perhaps the division of the bony spine would facilitate the whole matter, and allow the body more easily to double up. Decapitation, on the contrary, is usually rapid in its execution, and far more simple. Dr. Ramsbotham's decapitating hook (an instrument the same as a large polyptome) enables the neck to be surrounded and severed with little or no difficulty in cases threatening cephalic evolution, and perhaps could be applied also, if used early, in most cases threatening pelvic evolution. From the facility with which we have found decapitation to be effected in two or three instances of transverse presentation, where the child was distinctly *dead*, and turning was rendered difficult either by the contraction of the uterus, or by the actual advance of the child downwards into the pelvic brim or cavity, we have a strong conviction that it is a mode of delivery infinitely to be preferred, under such circumstances, to violent and repeated efforts at version.

NEW FORM OF OBSTRUCTION IN HEAD PRESENTATIONS FROM DORSAL DISPLACEMENT OF THE ARM.[1]

Dr. Simpson stated that he considered the case to which he wished to direct the attention of the Society an important one, because the peculiar obstruction in head presentations which it illustrated was, so far as he knew, hitherto undescribed. The form of obstruction consisted in one of the arms of the infant being displaced backwards across the neck or occipital region; or, more properly speaking, it was the forearm that was thus thrown across the back of the head and neck, the arm being thrown upwards in a line with the body, in order to admit of this malposition of the forearm. In this abnormal position the displaced elbow and forearm of the child first increased greatly the dimensions of the basis of the head; and secondly, these same parts formed a kind of pro-

[1] See Proceedings of Edinburgh Obstetrical Society, February 13, 1850, in *Edinburgh Monthly Journal of Medical Science*, April 1850, p. 389.

jecting obstruction, which readily hitched and caught upon the brim of the pelvis, thus preventing the descent of the head. But the effects might be better judged of by detailing the case itself.

The patient had previously borne nine children. All the labours had been easy, and she had frequently been delivered so speedily, that the labour was over before the medical attendant could reach the house. In her last and tenth labour, pains came on about four in the afternoon, and the os uteri was not completely opened up till about ten o'clock. About an hour before, the membranes ruptured. At six next morning, Dr. S. received a note from her medical attendant, Mr. Carmichael, asking him to see her, as the head had remained in the same position at the brim for several hours, the uterine contractions were becoming weak, and the woman herself exhausted. On placing the patient deeply under the influence of chloroform, in order to make a complete examination, Dr. S. found the maternal passages perfectly relaxed and open, and the head of the child to be by no means large, and not even entirely filling up the brim. The vertex presented, and the face was directed towards the left sacro-iliac synchondrosis—a rare enough position, but one not in any degree calculated to account for the delay. On passing the examining fingers farther upwards, in order to trace any possible obstruction, he touched a projecting body (the elbow) beyond the left ear of the child; and on now making the examination more carefully, he traced this body backwards across the neck of the infant, and found it to consist of the left forearm of the child thrown back posteriorly behind the head. He then brought the hand downwards and forwards, believing that if it were converted into a head and arm presentation, the case might terminate without farther interference. During the next half-hour, however, the pains, which had for some time been weak, had little effect in forwarding the presenting parts, and as the pulsation of the child's heart had now sunk as low as 78 beats in the minute, Dr. S., in order to preserve the child, again chloroformed the patient deeply, and delivered the child by podalic turning. The mother made a speedy recovery. The child soon cried strongly, and went on quite well. Its left arm was for a day or two after delivery easily thrown into the position described. The occipito-frontal circumference of

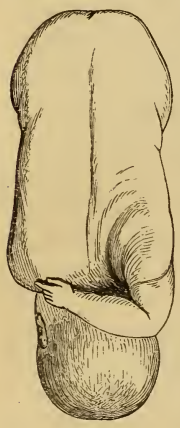

Fig. 7.

the head was afterwards measured by Mr. Carmichael, and found to be $14\frac{1}{4}$ inches; when the arm was placed in its anomalous position, the same circumference measured $15\frac{1}{2}$ inches. The circumference of the shoulders was $13\frac{1}{2}$ inches. The child was of about the usual size, and weighed $7\frac{1}{4}$ lbs.

The *Treatment* of such a cause of obstruction, when it was once recognised, should probably consist in bringing the hand downward and forward over the side of the head, so as to convert the case into one of simple presentation of the head and arm. Perhaps it might occasionally be possible to push the elbow forwards in the direction of the lower end of the sternum, and thus draw back the displaced arm into its normal position in front of the chest. If either of these measures proved impossible, or failed, then the podalic version would be required.

The *Diagnosis* of the case was the most difficult point in its management. And in this, as in other complications—as detention from intra-uterine hydrocephalus, etc.—the assistance of anæsthetics in midwifery was invaluable as a means of enabling the accoucheur to make a far more searching and successful manual examination and diagnosis, in cases of obstructed labour, than it was possible to do when the patient was awake and incapable of bearing with steadiness, and without unnecessary suffering, the introduction of the hand for the purpose.

When a labour, as in the preceding case, notwithstanding steady and continued uterine contractions, became morbidly prolonged in a mother who had previously borne easily a large family, there was every probability of obstruction of some kind on the part of the infant. Dr. S. had seen two such cases, where the detention was the result of intra-uterine hydrocephalus. In the present instance it was the result of the malposition of the arm. Some time since he had mentioned to the Society two cases of tedious labour, which, several years ago, he had seen with Dr. Ziegler: in both, the head, despite of strong pains, remained in the pelvic brim without descending; in both, the head was evidently not disproportionately large to the maternal passages; in both, some point of the shoulder or arm could be touched by the finger on examination; and, perhaps, if the examination could have been made more complete by the use of ether or chloroform, which were then unknown, a malposition of the arm, similar to the one above described, might have been detected. Various cases are recorded of obstructed labour, with the head, as usual, presenting, in mothers who had previously had natural deli-

veries, and where the forceps failed to extract the child, and where even extraction after craniotomy was difficult. Some of these cases were in all probability instances of obstruction from dorsal malposition of the arm, or rather of the forearm. The late Dr. Campbell, shortly before his death, had told him of a case where there was no pelvic or other deformity on the part of the mother, no want of uterine contraction, and no disproportionate size of the head of the child, and yet he and others had entirely failed in extracting the detained infant by the forceps, and at last were obliged to open its head.

When looked for, Dr. S. believed, therefore, that the dorsal malposition of the forearm would be found a more frequent cause of obstructed labour than the total silence of obstetric authors on the subject might, *a priori*, lead us to suppose. Further, he considered the present case as interesting, not only as an instance of an undescribed species of malposition and obstruction, but probably as one of a new *class* of malpositions as yet unrecognised in any of our accounts of the mechanism of labour, and the malpositions of the child. It would probably be found that other degrees and forms of malposition of the arm might occasionally lead to the same result.

ON THE DANGER OF RUPTURE OF THE UTERUS FROM HYDROCEPHALUS IN THE FŒTUS.

MODES OF DIAGNOSIS AND TREATMENT.[1]

Dr. Simpson described two cases to which he had recently been called, and in which fatal rupture of the uterus had previously occurred in consequence of hydrocephalus in the fœtus. Both mothers had borne large families without difficulty. In both cases their present labours were very prolonged, and the pains severe before the laceration occurred. And it might perhaps be laid down as a general principle, that when a mother who had previously borne children with the usual facility and safety, suffered a long and difficult labour, with the head never properly entering the brim, dangerous enlargement of the head from hydrocephalus or other causes should be suspected, and the most careful means instituted in order to make out a correct diagnosis. In this, as in other important cases, if the patient were put into an anæsthetic state, great

[1] See Proceedings of Edinburgh Obstetric Society, March 12, 1848, in *Edinburgh Monthly Journal of Medical Science*, June 1848, p. 885.

facilities would be given for making a careful and leisurely diagnostic examination of the child's head by the hand, without suffering or resistance on the part of the mother. The unusual size and dimensions of the head might be thus ascertained; but one source of fallacy was to be guarded against—namely, that the sutures and fontanelles were not, as was usually described, always preternaturally open and enlarged in hydrocephalic cases; for the cranial bones were in some instances, where the internal effusion was very great, so largely and abnormally developed as to destroy this supposed pathognomonic sign, and to form an almost complete osseous covering for the enlarged head. In one of the two cases described by Dr. Simpson, the cranial bones were, in this way, as large as in a child two or three years old. When hydrocephalus was attended with imperfect ossification, the enlarged and fluid head sometimes moulded itself so readily to the maternal passages as to pass without much difficulty even when of very great size. But the danger and difficulty was much increased when to this was added the impediment arising from enlargement of the bones themselves.

Mechanism of Rupture in Cases of Hydrocephalus.

The danger of rupture of the uterus, and consequent death of the mother, was much greater under hydrocephalus than obstetric authors commonly described. In a collection of cases of intra-uterine hydrocephalus made this year by Dr. Thomas Keith for his thesis, out of 74 instances of the disease which he had found on record, in 16 the uterus ruptured during labour. In fact, the diseased head of the infant, distended by the effused fluid, acted, under the impression conveyed to it by the body and spine of the infant during labour, like a hydraulic bag or machine, pressing equally and in all directions on the cervix uteri, or parts with which it was in contact, with a force under which these compressed structures were almost certain to rend, provided the pressure was of any great duration; because the force itself contained the sum and concentration of the whole power of the uterine contractions bearing on each point with which the bag of the head was in contact. Under such compression, any weak or fissured point was almost certain to yield. And if any hydrocephalic head or fluid bag of this kind passed into the vagina and remained there, the kind of universal compression of the vaginal walls to which it gave rise, was apt, if it did not lead to direct rending and laceration, to produce, if long continued, sloughing inflammation in these parts.

Removal of Hydrocephalic Head by Trocar.

Hence labours, in which the child's head was hydrocephalic, should not, if possible, be allowed to become prolonged; but when the delivery was not effected by the natural efforts, it was not perhaps necessary to destroy entirely such an infant during labour, by using, as was universally recommended, the crotchet or other mortal operative procedure. In some instances it was a matter of legal importance for the parents that the child should be born alive, though not capable of surviving. And a small trocar passed into the hydrocephalic collection was capable of evacuating the contained fluid as efficiently as a more extensive and fatal laceration by the usual obstetric perforator or scissors; nor was such an evacuation by the trocar necessarily fatal to the fœtus, for we know that in the operation for hydrocephalus on the child after birth, by Dr. Conquest and others, the simple puncture of the head was by no means a fatal operation. Those operated on seldom or never died of the operation itself, but of the subsequent re-accumulations and consequences.

Evacuation of Fluid by the Spinal Canal, when the Presentation is Pelvic.

The hydrocephalic fœtus not unfrequently presented by the feet or breech. In a case of this kind which occurred some time ago to Mr. Girdwood of Falkirk, and where the child was dead and putrid, the spine and skin over it lacerated at the neck, in making the usual tractions to bring down the head. A great quantity of water escaped from the laceration, and the enlarged head, which had previously resisted the force applied to it, was now easily extracted in its collapsed state. This case afforded a suggestion, that under a similar complication, with the body already born, instead of passing our hand and perforator to the brim of the pelvis, in order to puncture the head, which was sometimes a matter of no small difficulty, we might attain the same end, the evacuation of the hydrocephalic effusion, by the more simple and safe measure of opening the vertebral canal in any part of the course of the spine.

ON THE STATE OF THE FŒTAL PULSE DURING LABOUR AS AN INDICATION OF DANGER TO THE CHILD.[1]

Dr. Simpson made some remarks on the indications afforded by the stethoscope for expediting delivery, and especially directed the attention of the Society to the fact, that while danger was usually indicated to the mother during labour, by the increased rapidity of her pulse, the death of the child was most frequently threatened when the fœtal pulse became slower and slower.

It was known that in cases where, during labour, pressure was exercised upon the cord, as in presentations of the cord, the pulsations of the fœtal heart became feebler, and were at length suspended by the continuous pressure. This was apparently the way in which the fœtus generally perished, during severe and protracted labours—the aëration of the blood by the placenta being thus rendered imperfect, or entirely suspended.

There were, however, rarer cases in which danger was indicated to the child, by the fœtal pulse becoming much more rapid than ordinary, reaching 150 or 160 beats in the minute, and at the same time being often very irregular or intermittent. Dr. S. believed the danger in these latter instances did not result from pressure on the umbilical cord, as in the cases where the pulsations became slower and slower, but arose from pressure or some source of irritation acting on the brain.

ON THE MODE OF APPLICATION OF THE LONG FORCEPS.[2]

When the head of the child becomes fixed in the brim of the pelvis, and the powers of the uterus fail in propelling it through that aperture, one of two modes of instrumental delivery is usually resorted to—namely, either, 1. Diminution of the infant's head by perforation and craniotomy; or, 2. Extraction of it by the long forceps.

Craniotomy is the preferable operation where the child is dead, and where the pelvic brim is much contracted, or the child's head very much above the average size. But besides being always necessarily fatal to the child, craniotomy is an operation by no means without danger to the mother;—one in every five mothers, accord-

[1] See Proceedings of Edinburgh Obstetrical Society, Session xiii., in *Edinburgh Monthly Journal of Medicine*, April 1855, p. 346.

[2] See Proceedings of Edinburgh Obstetrical Society, May 10, 1848, in *Edinburgh Monthly Journal of Medical Science*, September 1848, p. 193.

ing to Dr. Churchill,[1] dying, upon whom it is performed. And in most schools of midwifery, it is now, consequently, much more rarely practised than heretofore. Still many authors and practitioners, as Drs. Collins, Johnson, Lee, etc., appear to resort to it in all cases in which the bulk of the head is unable to pass the brim, and reject entirely the other alternative of the long forceps.

The long forceps afford in these cases the best chance of life to the child, and when used with proper views of their mechanism and mode of application, their employment, as is often seen in Edinburgh practice, is by no means so difficult and dangerous as some authorities seem to believe. Misapprehension on these points is perhaps the cause why they are not more frequently used. They differ from the short forceps in some points of construction, but more particularly in regard to their mode of application and working. They differ, for example, in their length; in the shanks being parallel for some distance beyond the lock, an indispensable point in order to prevent their injuring the outlet; in their blades being curved; and in the part intended to embrace the head being sufficiently long and large. The instrument which Dr. Simpson has frequently and successfully used during the last five or six years, has some additional peculiarities, as is seen in the woodcut. The blades are the same as Dr. F. Ramsbotham's, but scarcely so much curved. The lock is Smellie's, but with knees or projections above it of such size as to prevent the blades readily unlocking in the intervals between the pains, thus giving it the fixed character of the locks of Levret and Brunninghausen's instruments, without their complexity. The joints are made so loose as to allow of their lateral motion and overlapping to a very considerable degree, thus facilitating their introduction and application. And, lastly, the handle is that used by Naegele and other German accoucheurs—viz. with transverse knees or rests below the lock for one or two of the first fingers of the right hand to drag by, the long forceps being only properly used as an

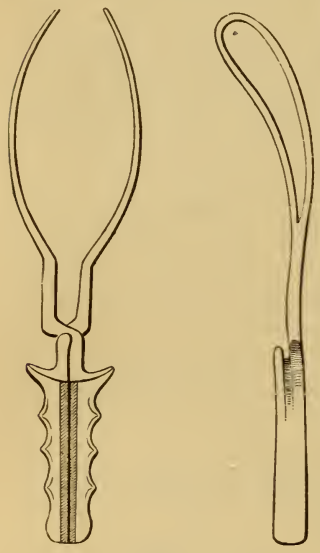

Fig. 8.

[1] *Operative Midwifery*, p. 173.

instrument of traction, not of compression. In addition, the handles are grooved and marked on the anterior side, to distinguish that from the other side when the blades are within the pelvis. The following are some of the dimensions of Dr. Simpson's forceps :— Length of the entire instrument, 13¾ inches; length of handle, including the lock, 5¼ inches; length of shank, from the lock to the commencement of the curve of the blade, 2¼ inches; length of the blade, 6¼ inches; extreme breadth of blade at 1½ inches' distance from the point of the instrument, 1¾ inches; length of the fenestra, 4½ inches; extreme breadth of the fenestra, 13 lines; breadth of the groove of the lock, ⅜ inch; thickness of the shank to fit in the groove of the lock, ⅜ inch; extreme distance between the blades at three inches' distance from the point of the forceps when locked, 3 inches; distance between the points of the two blades when locked, 1 inch.

In their modes of application, the long forceps differ from the short. The short forceps are applied always to the lateral surfaces of the child's head, in whatever position the head may be. Generally, the long diameter of the head lies in the right diagonal diameter of the pelvis; and, consequently, the short forceps are placed in the opposite or left diagonal diameter; or, in other words, at right angles to the long diameter of the head. The mode in which the long forceps ought to be applied, and are really applied in practice, has given rise to considerable difference of opinion.

If the long forceps are ever, for inertia, hemorrhage, or other such complications, in any case applied while the head is passing through the brim, and the brim and head are natural in size, the instrument may be perhaps applied, like the short forceps, directly to the lateral surfaces of the child's head. But the common reason for the employment of the long forceps is morbid contraction of the brim o the pelvis in its most general form, and from its most general cause —viz. in the conjugate or antero-posterior diameter, from projection forward of the promontory of the sacrum. How are the long forceps applied when used in this, the case in which they are most generally had recourse to in practice? It is first requisite to state, that under this complication the child's head is found situated in the brim, with its long or fronto-occipital diameter lying in the transverse diameter of the brim, or with the forehead looking to one ilium, and the occiput looking to the other. In other words, the long diameter of the head is not placed, as usual, in the right diagonal diameter of the brim, but more in its transverse; for where the promontory of the sacrum forms a morbid projection, the transverse

forms the longest diameter of the brim, and, consequently, the one in which the child's head comes to be placed by the uterine efforts. The face or forehead looking to the ilium, and the occiput to the other ilium, the lateral surfaces of the child's head come to be compressed between the protruding sacral promontory and the interior of the symphysis pubis. Now, in seizing the head in this case some authors aver, that—

1*st. The blades of the long forceps are placed, as in applying the short forceps, on the lateral or aural surfaces of the child's head*, and consequently with one blade in front of the sacral promontory, and the other behind the symphysis pubis. Burns,[1] Dewees,[2] etc., speak of thus applying the long forceps in the conjugate diameter of the brim; and Dr. Churchill[3] has published a woodcut representing this as the actual method of their application in practice. But its application in this position is impossible in the very cases in which the long forceps are generally required—viz. where the conjugate diameter is contracted, for there is not room for the additional thickness of the blades of the instrument; if applied, they add to the thickness of the head in that one diameter and place in which it is already too thick and large; their pressure would greatly endanger the urethra and bladder in front, and the soft structures placed over the promontory of the sacrum behind; and they could not thus be placed in the axis of the brim in consequence of the pressure of the perineum upon the instrument below. Other authors aver, that—

2*dly. The blades of the long forceps should be placed over the occiput and forehead or face of the child, and consequently in the transverse diameter of the brim.* This is the view of their mode of application taken by Deleurye,[4] Davis,[5] etc. etc., and approaches much nearer the reality than the former opinion; but that it is not strictly true is shown by the marking of the place of application of the blades of the instrument after the child is born, and by a more attentive consideration of the mechanism of such labours. One blade is found to have been placed behind one ear, and the point of the other to have pressed upon the side of the forehead, temple, or region of the eye; but these would not be the places of the markings of the blades if they were applied in the transverse diameter,

[1] Burns' *Midwifery*, p. 488.
[2] Dewees' *System of Midwifery*, p. 315.
[3] Churchill's *Midwifery*, Fig. 76, p. 298.
[4] Deleurye, *Traité des Accouchemens*, p. 340.
[5] Davis' *Operative Midwifery*, p. 242.

upon a head placed directly transverse. Dr. Ramsbotham[1] has published a beautiful plate of the mode of application of the long forceps, and has given an excellent chapter on the subject in his work on Midwifery. He correctly represents in the plate the anterior blade as placed upon the side of the forehead and eyebrow; but in order to give this view with the forceps placed in the transverse diameter of the brim, he has been obliged to represent the face as turned backwards, whilst in reality, in morbid contractions of the conjugate diameter of the brim, it is actually turned laterally; and he places the long diameter of the blades of the forceps so as to traverse the right oblique, instead of the left oblique pelvic diameter.

3*dly. The blades of the long forceps should, I believe, be placed obliquely upon the child's head—one, the posterior, over the side of the occiput; and the other, or anterior, over the side of the brow or temple; and consequently they should be generally situated somewhat in the oblique diameter of the brim,* as in the woodcut. The markings on the child's head after birth always show this mode of application of the instrument: when properly applied upon the mother, and when their situation relative to the pelvis is examined, they are found to have assumed this position; and in experiments with the instrument, when the head of a dead child is fixed in a pelvis with a contracted brim, this is the position and relation which the instrument will be seen to assume with relation to the infantile head and maternal pelvis. Besides, in thus placing the instrument, while we incur less danger of injuring the urethra and other important parts, we place the blades of the instrument in exactly those parts of the

Fig. 9.

[1] Ramsbotham's *Obstetric Medicine*, plate lvi.

pelvic circle where there is least pressure, and consequently most room for them. It is apparently in consequence of misconception on this point, that some authors have come to prefer the use of the perforator to that of the long forceps. Dr. Collins, for example, argues that when the head is detained in the pelvic brim, the brim "measuring little more than three inches from pubis to sacrum," there cannot possibly be space for the long forceps even were the bones denuded, seeing that the blades of the smallest-sized forceps used in Britain, even when completely closed, measure from $3\frac{1}{8}$ inches to $3\frac{1}{2}$. "How," he adds, "is it possible with the forceps to drag a child through a pelvis where there is not space, except by force, to introduce, as is commonly said, a straw, or where, the smallest flexible catheter cannot be passed in some instances into the bladder?" These and such opinions proceed on the erroneous idea that the long forceps are to be applied, within the pelvis, at the parts, or in the diameter in which the pelvis is *most* contracted, and they suppose that the head, when fixed in the pelvic brim, fills completely the *whole* circle of the brim. The usual shape of the morbidly contracted pelvic brim is cordate, or rather elliptico-cordate; but the child's head is not of this shape, it is ovoid, and consequently, when applied to the cordate brim, leaves unoccupied spaces. The most unoccupied spaces, before and behind, are at the extremities of the oblique diameters of the brim, where sufficient room is left for the passage of the blades of the forceps, and in these points they are passed when properly applied.

MODIFICATION OF THE CEPHALOTRIBE.[1]

Professor Simpson exhibited a number of cephalotribes which

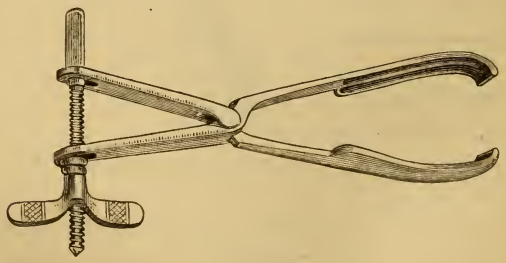

Fig. 10.

were used on the Continent, one of which he used in Dr. Bryce's

[1] See Proceedings of Edinburgh Obstetrical Society, April 27, 1864, in *Edinburgh Medical Journal*, August 1864, p. 180.

case. They were all, however, very heavy and clumsy. He had endeavoured to improve upon them, and had got an instrument made (see Fig. 10), which he also showed, of a similar construction, but of much smaller dimensions, being only the length of an ordinary pair of forceps. He had not as yet, however, had an opportunity of testing it in the delivery of a child, but was able to thoroughly break up the base of the skull of a newly-born dead infant.

ON TURNING,

AS AN ALTERNATIVE FOR CRANIOTOMY AND THE LONG FORCEPS, IN DEFORMITY OF THE BRIM OF THE PELVIS, ETC.

Dr. Simpson, presenting the following papers on this subject in 1850, in a collected form to his pupils, prefaced them with the following remarks :—

"During a residence of a few weeks on the west coast of Scotland in the autumn of 1847, I wrote the following imperfect Memoir; and it was subsequently published in different numbers of the *Provincial Medical Journal*. The date of absence from my duties in Edinburgh expired before I had time to finish the Essay; and hitherto, other avocations and inquiries have prevented me from redirecting my attention to the subject. Four additional sections or chapters were intended to be added—namely, one on the mechanism of the proposed mode of delivery as influencing the steps of the practice itself; a second, on the cases of obstructed labour chiefly adapted for delivery by turning; a third, on the best mode of conducting the operation in these special cases; and a fourth, or last, upon the history of the practice in ancient and in modern times.

"The Essay is placed in its present unfinished form in the hands of my pupils, principally with the view of saving time in the discussion of the subject in the class-room; and the preceding notice is offered to them as some apology for its many deficiencies."

Sect. I.—Illustrative Case, and Introductory Remarks.[1]

At a meeting of the Obstetric Society of Edinburgh, held on the 20th of January 1847, I had an opportunity of showing to the members a large infant, extracted on the preceding evening by the operation of turning, through a pelvis, the brim of which was greatly

[1] See *Provincial Medical and Surgical Journal*, December 14, 1847, p. 673.

contracted. The following particulars were at the same time stated regarding the history of the case.

Case I.—The mother was very lame, with the lumbar vertebræ much distorted, and had been twice pregnant. Her first labour had been extremely protracted, in consequence of the promontory of the sacrum projecting forwards and downwards, so as to diminish much the conjugate diameter of the brim. After being several days in labour, symptoms requiring interference supervened, and Mr. Figg, her medical attendant, availed himself of the able advice of my friends Drs. Malcolm and Marr. These gentlemen considered it proper to ascertain whether the child might not be capable of being delivered, without the dire necessity of embryulcio. After a long and cautious trial, however, of the long forceps, they found it impossible to advance the head with them, and were at last driven to have recourse to craniotomy. Even after the cranium was perforated, and freely broken down, it was found a matter of much time and difficulty to drag with the crotchet the collapsed head of the fœtus through the distorted brim, and the patient made a very long and protracted convalescence.

She was earnestly advised to have premature labour induced, provided she again fell in the family way; but Mr. Figg was not made aware of her state till she was near the end of the ninth month of her second pregnancy, and when it was too late to justify interference. Parturition supervened in a few days. I saw her with Mr. Figg on the afternoon of the 19th of January, a few hours after the first labour-pains had commenced. The os uteri was tolerably well dilated, the membranes still entire; and the head, which was difficult to reach, was found high and mobile above the brim of the pelvis; a pulsating loop of the umbilical cord was prolapsed before it. During the course of the few following hours, no advance being made, I proceeded shortly after nine in the evening, for the labour had commenced in the forenoon, to make the mother inhale the vapour of sulphuric ether, and to extract the child, as I had previously determined to do, by the operation of turning. The os uteri was so dilated, as not to offer any impediment to the introduction of the hand; the head was pushed aside, and a knee seized with great ease. With this hold the infant was readily turned, and its extremities and trunk drawn down, but the extraction of the head through the distorted brim was a more difficult task. After the arms were brought down, very great exertion in the direction of the axis of the brim was required before the head was extracted; still not above two or three minutes elapsed from the first introduction of the hand till the complete extraction of the infant. It gasped several times after it was born, but full respiration could not be established. Its head was compressed laterally, the left parietal region flattened, and the anterior part of the right parietal bone deeply indented by the pressure to which it had been subjected against the projecting promontory of the sacrum. The transverse or bi-temporal diameter of the head, at the seat of the indentation, was found, on careful admeasurement, and when held compressed by the fingers, not to be above two and a half inches. Hence the conjugate diameter of the brim did not, in any probability, exceed this. The infant, a female, was large, and above the usual size; it weighed exactly eight pounds, the average weight of the female infant at birth being about six pounds and three quarters. In consequence of being placed under the complete anæsthetic influence of the inhalation of sulphuric ether before the operation was begun, the mother was quite unconscious of pain or suffering during the whole process of the turning and extraction of the infant. She made a recovery that was uninterruptedly good and rapid, and left her bed, dressed, and walked into the next room, on the fourth day after delivery.

The preceding case was, at the time of its occurrence, one of intense interest to me in two points of view. For, *first*, it was the first case in which I or any other accoucheur had ever tried the effects of ether-inhalation during labour, and so far it is, I believe, destined to form the commencement of a new and important epoch in obstetric practice. But, *secondly*, the case appeared to me to be one of great moment as an apposite illustration of views which I had been previously led to entertain, as to the possibility and propriety of substituting, in some instances, extraction by the feet for extraction by the crotchet—the delivery of the infant by the hand of the accoucheur instead of its delivery by instruments—the lateral compression of the child's head by the contracted sides of the pelvis, instead of its more dangerous oblique or longitudinal compression by the long forceps—and, *above all, the transient and not necessarily fatal depression of the flexible skull of the fœtus, for the destructive and necessarily deadly perforation of it.*

It is in this second or latter point of view that I propose to consider the preceding and other analogous cases in the present memoir.

In directing the attention of the Obstetric Society in January last to the case which I have stated above, and its relations to the question of turning, I took occasion to state that I had practised the same operation as an alternative for craniotomy and the long forceps, in other instances in which the head had been morbidly detained at the brim, from the existence of disproportion between the two ; and that I believed it to present the following advantages over embryulcio :—It gave the child a chance of life ; it was more safe to the mother, because it could be performed earlier in labour and more speedily ; it enabled us to adjust and extract the head of the child through the contracted pelvic brim in the most advantageous form and direction, the head flattening laterally under the traction ; the neck, if the child were living or only lately dead, was so strong as to allow us to exert such a degree of traction upon the obstructed head, that the sides of the cranium might become very greatly compressed, or even indented under it, and that without necessarily destroying the child ; and lastly, it was a practice which could be followed when proper instruments were not at hand, and the avoidance of instruments was generally desirable, when it was possible.

These observations were published in the March number of the *Monthly Journal of Medical Science* for 1847, p. 718.[1] In a later

[1] I had previously stated the details of the case just related at page 639, and I again had occasion to do so at page 721 of that journal.

number of the same Journal, in describing a case of delivery through a pelvis extremely deformed by malacosteon, I took occasion to discuss, in brief terms, the different means of treatment required in contracted pelves of different dimensions; and I repeated in the same words the above advantages of turning in comparison with embryulcio. At the same time I stated, in addition, in relation to the theory of the practice, my belief "that when the child presents by the feet, and thus the apex, instead of the vertex or base of the cone, formed by the head and body of the fœtus, comes first, it may make its transit without embryulcio, through a pelvis, the smallness of which would otherwise have necessitated mutilation or the operation of craniotomy."

The essay from which I make this extract appeared in the number of the Journal for the 1st of July 1847.

A few weeks subsequently—viz. in the *Provincial Medical and Surgical Journal* for July 28th—Dr. Radford of Manchester engaged in the investigation of the question, by publishing a communication "On Turning in Labours rendered Difficult by Distortion of the Pelvis." In this communication Dr. Radford avoids all allusion, by name or reference at least, to the previous observations which I had ventured to offer to the profession on the subject, and he propounds the practice to his readers as if it were a new and original suggestion on his own part, as far as British midwifery is concerned. At the same time, in a spirit of true humanity, which does him high honour, he strongly declares that "whatever practice can safely supersede the murderous operation—craniotomy—should be adopted." "The records of operative midwifery ought not," he observes, "to be stained with so barbarous a procedure, which, according to the present recognised principles of practice, is so unconditionally and so unhesitatingly performed." "And," he adds, "it cannot be a matter of surprise that I should, entertaining opinions that craniotomy ought to be considered an operation of nccessity, and not of election, hail with delight any measure which only promises to lessen the number of these destructive operations."

Afterwards, Dr. Radford proceeds to offer some remarks which evidently show that he has mistaken, alike in its principles and in most of its details, the alternative operation which I had proposed to substitute for instrumental delivery; the fault, however, is, I believe, chiefly or entirely, my own, and is a natural result of the brevity and imperfections of my previous notices on the subject. Indeed, I have reason to know, that Dr. Radford's misconceptions

of the proposed practice are, on this very account, shared in by many others. It is with the anxious view of remedying this defect that I draw up the present communication, and I trust that the great practical importance of the questions discussed in it will stand as some apology for the otherwise unwarrantable prolixity and repetitions that may possibly be observed in the discussion.

In following out the object I have indicated, I shall treat severally and successively of the kind of cases which gave rise to the suggestions of the proposed practice; of the theory, principles, or mechanism of the practice; and of its advantages in relation to the curtailment of the duration of labour. I shall then answer the objections which I have heard raised against it, in relation to the safety of the infant, and the safety of the mother; and lastly, I shall consider the classes of cases best adapted for the practice, and the conditions requisite for its success.

Sect. II.—Evidence suggestive of the Practice.[1]

In studying, in their more minute details, the obstetric histories of recorded cases of morbid contractions of the pelvis, I have often been forcibly struck by the circumstance, that apparently when the child presented preternaturally, and in consequence ultimately passed with the feet or pelvic extremity first, the labour seemed frequently both easier and safer to the mother and infant, than when, in other labours in the same patients, the head of the fœtus happened to form the presenting part. In this way, mothers who had always suffered under very severe and instrumental labours, when their children presented with the head foremost, were, I found, not unfrequently fortunate enough to escape far more easily, when, at other times, the infant chanced either to present originally with the feet, or had the feet artificially brought down during the labour in consequence of the infant lying transversely with the arm or shoulder constituting the presenting part;—nay, the history of some few cases incidentally but strongly showed, that when the distortion and obstruction in the maternal passages were so great as to have invariably necessitated in all the previous labours the death of the infant by the operation of craniotomy, a living child was occasionally at last happily born alive, when it happened to pass, or to be brought through the contracted pelvis as an original or artificial footling presentation In such instances the presentation

[1] See *Provincial Medical and Surgical Journal*, December 14, 1847, p. 675.

of a hand or foot, when first discovered at the commencement of labour, has been regarded as an undoubted source of increased danger and difficulty, but it has at last more frequently proved a source of increased safety to the mother, and the indirect means of the preservation of the infant.

As an illustration of these remarks, I might appeal to the evidence of many different cases observed and recorded by different authors, without any view to such a question as that which forms the subject of the present memoir. But to avoid superfluity of proof, I will in the meantime restrict the evidence to a very abridged statement of similar cases recorded by one or two authors; and for this purpose, I first select the work of Dr. Smellie, believing, as I sincerely do, that his writings are not less remarkable for the strong thought and singular practical sagacity which they display, than for the spirit of candour and truthfulness with which all his facts are reported. In his volumes, Dr. Smellie has recorded an unusual number of contracted and distorted pelves; among them I find the following cases illustrative of the remarks which I have ventured to offer in the preceding paragraphs. The three first cases relate to natural pelvic presentations; the two last are instances in which the child was extracted footling, in consequence of its presenting transversely, or with the upper extremity.

Case II.—To a woman "who had suffered *very much* in her former labours from the pelvis being distorted," Dr. Smellie was called, and found the breech of the child presenting. The extraction of the head required considerable management, but the child was saved.[1]

Case III.—Dr. Smellie's assistance was requested for a patient with "the breech presenting, and the pelvis distorted." The midwife told him "that the woman's former labours had been *very* difficult and tedious, but now as the breech presented she was afraid the difficulty would be greater." He "saved this child also, although a good deal of force was used to deliver the head."[2]

Case IV.—A woman, with the "pelvis narrow," and "who formerly was used to have tedious labours," had a breech presentation. Dr. Smellie brought down the legs, "as the breech did not advance with the assistance of the strong pains." The child was delivered with difficulty, but alive.[3]

Case V.—A woman, with the "pelvis distorted and awry, from the right ilium being much higher than the other," was three times pregnant. The first labour was terminated by craniotomy. The child in the second labour was premature, and presented by the arm. It was brought away alive by turning. In her third labour the child reached the full time, presented by the head, was turned and lost.[4]

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[1] *Collect.* 32, Case 10. [2] *Ibid.* Case 2. [3] *Ibid.* Case 13.
[4] *Ibid.* 34, No. 2, Case 1.

Case VI.—A woman, with "a narrow and distorted pelvis, from the three lowest vertebræ of the loins bending forward," four times reached the full period of pregnancy. In her first and third labours the child required to be mutilated by craniotomy before delivery could be accomplished. The infant in the second labour was small, and "with the greatest difficulty saved, by the assistance of the forceps." At the fourth confinement the right shoulder of the child presented. Dr. Smellie first tried cephalic version, but failed. He then seized one leg, turned the child, brought out the body and extremities, and ultimately, after much exertion, extracted the head. The child was alive. The mother recovered better than in any of her preceding labours.[1]

In his *Clinical Midwifery*, Dr. Lee reports the following case as one probably similar to those which first suggested the propriety of the artificial induction of premature labour:—

Case.—The patient had been five times pregnant. She was delivered of her first child by craniotomy. Dr. Lee employed the same operation to deliver her at her fourth confinememt. "At the end of the seventh month of her second pregnancy, labour came on spontaneously, and the child was born alive without artificial assistance, and has been reared." Her third pregnancy was terminated by labour coming on at the commencement of the eighth month. "The nates presented, and the child was also extracted alive." "Dr. H. Davies induced premature labour at the seventh and a half month of her fifth pregnancy, and the child was born alive, but died soon after in convulsions."

Occurrences similar to what happened in the preceding case must, observes Dr. Lee, "originally have suggested the idea of bringing on premature labour artificially in cases of distorted pelvis, and probably led, in 1756, to that consultation of the most eminent practitioners in London, at which the practice was approved of, and soon after successfully carried into effect by Dr. Macaulay;"[2] and by a similar study of the modes of delivery occasionally adopted by nature in the same cases of distorted pelvis, we have, I think, suggested to us likewise the propriety of artificially turning and extracting the infant as a footling presentation. I shall cite only one other case from the same writer, showing the degree of difficulty in contracted pelvis to be less when the child passes by a pelvic or footling presentation, than when it presents and passes by the cephalic extremity.

Case VII.—A patient, with the outlet and brim of the pelvis both considerably contracted, was delivered of her first child by craniotomy, after being more than forty-eight hours in labour, and extremely exhausted. "The difficulty," Dr. Lee remarks, "experienced in extracting the head with the crotchet, after it was opened, *proved* that delivery could not have been completed by any other method." At her third labour she was again delivered by craniotomy, after the labour had

[1] *Collect.* No. 5, Case 2. [2] *Clinical Midwifery*, Case 81, p. 39.

endured for some time, and four fits of convulsion had supervened. "I found her," says Dr. Lee, "completely insensible, with dilated pupils and constant convulsive movements of the muscles of the face. The pains continued with such violence, and recurred at such short intervals, that I dreaded rupture of the uterus. * * * The small size of the pelvis, the impossibility of applying the forceps to the head, the imminent risk of rupture of the uterus, with the result of the former labour, were the circumstances which made me determine to open the head." At her fourth confinement, the child's head was again perforated. Labour had commenced on the 2d of December; the liquor amnii escaped soon after; the pains continued strong and regular during the whole night. On the morning of the 8th, six days after labour "had commenced," the head being still wedged in the brim, the abdomen tense, the patient occasionally delirious, etc., craniotomy was performed. The patient was thus delivered by embryulcio in her first, third, and fourth labours. The history of her second confinement is this—"I proposed to induce premature labour on the 21st of July 1835, when she was seven months and a half pregnant; but she would not consent to this. Labour came on spontaneously at the commencement of the ninth month of pregnancy; a foot presented, and the child was extracted dead, without craniotomy." [1]

These, I repeat, and similar instances (and I shall have occasion to quote cases still more striking in the sequel), appear to me to point evidently to this probable conclusion—that in particular forms and instances at least, of distorted pelvis, the passage of the child by the feet or pelvic extremity affords to it and the mother some special facility of transit which is wanting when the head or cephalic extremity forms the presenting part. And we have thus placed before us this problem:—Upon what does this greater facility and safety of footling, as compared with head presentations, in such cases, depend? Let us proceed to the consideration of this point, and attempt to ascertain how this result is obtained.

Sect. III.—Theory or Principles of the Proposed Practice.[2]

The form of the infant at birth has often and justly been compared to that of a cone; the feet serving as the apex, and the arch or bi-parietal diameter of the head forming the basis of the cone, and there being a gradual tapering and increase of size from the former to the latter point. Consequently, when, in cephalic presentations, the head or broad end of the cone once dilates and passes a given point, the narrow remainder of the cone, viz. the trunk and extremities, afterwards pass it without impediment. In fact, both in cranial and in footling presentations—even in instances of contracted pelvis—the transit of the body is usually attended with no special difficulty or delay. The obstruction is referable to the

[1] *Clinical Midwifery*, p. 62.

[2] See *Provincial Medical and Surgical Journal*, January 12, 1848, p. 1.

child's head alone; and hence the necessity of accurately studying the obstetric configuration and relations of the fœtal head, in order to be able to overcome the obstruction offered by this part.

Now, besides that the whole infant is, as I have just stated, of a conical figure, the head taken alone presents more imperfectly the same configuration; for the basis of the skull is considerably narrower than the arch; or, in other words, its bi-mastoid diameter (*b b*, Fig. 11) is less than its bi-parietal diameter (*a a*), so that the cranium increases gradually in breadth and size, like the whole body, from below upwards.

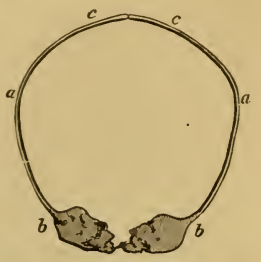

Fig. 11.

The bi-parietal diameter of the head or vertex is, in this way, the *basis* both of the cone of the whole body, and of the cone of the head taken singly.

To understand thoroughly, however, the subject of our present inquiries, it is necessary to have some more precise and definite ideas of the degree of tapering of the cranium from its broad arch to its narrow basis; or, in other words, it is requisite to fix more accurately the degrees of difference between the bi-parietal and bi-mastoid diameters of the head. With this view, I made some months ago, upon the heads of several new-born infants, a variety of measurements relative to these two points. I arrived at nearly the same conclusions as those which I afterwards found Mr. Tomlinson had previously obtained, when admeasuring the fœtal head for the purpose of assisting Dr. Hull in his inquiries as to the smallest dimensions the skull could be possibly reduced to, by the operation of craniotomy. And, to prevent all cavil, I will here take Mr. Tomlinson's measurements as standard and correct, and the more valuable on this account, that they were made and published without any view to such a question as the present.

Mr. Tomlinson gives, among other measurements of the head, the breadth of the bi-parietal and bi-mastoid diameters in six infants at birth. I shall throw them into a tabular form, and add a column, showing the difference between these two diameters in each case.

Fig. 11. Vertical section of a fœtal skull, showing its conical form.

TABLE I.

MEASUREMENTS OF THE BI-PARIETAL AND BI-MASTOID DIAMETERS OF THE HEADS OF SIX INFANTS AT BIRTH.

Number of Case.	Bi-parietal Diameter.		Bi-mastoid Diameter.		Difference between the two	
	In.	Sths.	In.	Sths.	In.	Sths.
I. . . .	3	4	2	7	...	5
II. . . .	3	6	3	2	...	4
III. (a twin)	3	1	2	6	...	3
IV. . . .	3	2	2	6	...	4
V. . . .	3	3	2	6	...	5
VI. . . .	3	4	2	6	...	6

We thus find a difference between the bi-mastoid and bi-parietal diameters of the head, varying from three-eighths to six-eighths of an inch, or from four and a half to nine lines. Or, if we exclude, as in fact should properly be done, the third case, as being a twin infant, and consequently having the head and body smaller and less remarkable than in a single and full-sized child—then we have, in the remainder, a difference between the bi-parietal and bi-mastoid diameters, varying from six to nine lines—that is, from four to six eighths of an inch; or, in other words, *from half-an-inch to three quarters of an inch.*[1] And in artificially extracting an infant through a narrow pelvis, as a footling instead of a head presentation, we may gain, I believe, when necessary, this great difference between the size of the body to be extracted, by varying the method of the extraction itself. For it must be further held in view that at its base (or bi-mastoid diameter), the cranium of the infant is so strong, and its bones so firmly and densely united, as to render it quite incompressible. On the other hand, at its arch (or bi-parietal diameter), the cranium at birth is, in general, so thin, and its bones so loosely and imperfectly united, as to permit of the head being much flattened and compressed, or even depressed and indented at some point, without necessarily destroying life.

Now, when the brim of the pelvis is morbidly contracted at one part—let us imagine, for instance, its conjugate diameter to measure only three inches instead of four—then the child, upon being forced

[1] "From the one parietal protuberance to the other, a transverse line measures from three inches and a quarter ($3\frac{1}{4}$) to three inches and a half ($3\frac{1}{2}$). From one mastoid process to the other along the base is about two inches (2). From the one temple to the other is two inches and a half ($2\frac{1}{2}$)."—Dr. Burns' *Principles of Midwifery*, 10th edition, p. 25.

down upon it as a head-presentation, meets with difficulties which, probably, no uterine effort could possibly surmount. A round body, the diameter of which is some lines *above* three inches, is attempted to be pushed through an opening measuring *only* three inches. But, turn the child, extract it footling, and let the head pass through the contracted brim, by engaging in it first the base or bi-mastoid diameter of the cranium, and the difficulty may possibly be overcome; for then we have the head entering the contracted brim of three inches as a body *less* in its diameter than three inches, and capable of having its broader upper portion flattened and reduced to the size necessary for its complete transit, by the force which we can apply to the already protruded body of the infant, producing the requisite degree of lateral compression of the cranium against the opposed sides of the contracted pelvic brim.

Or, let us take another and perhaps simpler view of the subject. Suppose, in want of a better woodcut, we take the letter A as a round cone simulating the figure of the infant, the apex of the letter corresponding to the feet of the infant, the base of it corresponding to the bi-parietal diameter of the head, and the cross-bar of the letter representing the incompressible floor or basis of the skull, and the two divergent feet of it representing the elastic and compressible arch of the cranium. Now, if we desired to pass this round cone A through an oblong aperture O, the diameter of which was somewhat *less* than the diameter of the basis of the cone, should we succeed best by pushing it through the oval opening with its basis foremost, or by dragging it through it with its apex foremost? If we extract the cone through the aperture by bringing its narrow end foremost —or, in other words, if we bring the child by the feet instead of the head—then two objects are gained; for, first, we have the power of using any justifiable degree of force that may be required, by the command we thus obtain of the protruded and narrow end of the cone; and, secondly, the elastic sides of the base of the cone situated above the cross-bar—or, in other words, the sides of the cranium itself above its basis—will yield and become compressed together to such an extent as to enable the collapsed body to pass through the supposed opening. If, on the other hand, we attempt to make the broad basis of the cone, or the vertex of the head, to pass first through an aperture less than its own diameters, then we are apt, the more we press, to increase rather than diminish the difficulty attendant upon its transit; for the more force we apply we are liable to render that part which is already too broad, still broader, by flattening it

against the sides of the aperture, and making its limbs or parietes at one point or another diverge and widen, instead of converge and contract. It is true that if we can insinuate, *obliquely* or otherwise, the basis of the compressible cone (or the arch of the head), into the contracted aperture, so as to get *its* sides compressed between the sides of the opening, and consequently its bi-parietal diameter lessened by the force with which the body of the cone is pushed downwards, a similar object would be gained, but in a more uncertain and imperfect degree. Besides, there is always in this way the chance of making the two sides of the cranial arch (2 2, Fig. 12) spur out, and diverge lower down at *their* basis, in proportion to the amount of force applied to the upper surface of the arch itself (*c c*); so that, while we contract the sides of the arch above by the kind of pressure applied to it, the direction of that pressure may possibly widen and open the limbs of the arch below, and so far increase, for the time being, the difficulty accompanying the transit of that part.

But this transverse or lateral form of flattening and compression of the cranium is very far indeed from being always obtained when the vertex is allowed to present at the brim of a distorted pelvis; for frequently the whole, or the greater mass at least, of the head remains obstinately above the brim, despite the action of the propelling efforts upon it of labour-pains, both dangerous in the amount of their duration, and dangerous in the amount of their force. By bringing, however, the *apex* of our cone, or the narrow diameters of the cranium foremost, we not only improve and simplify the mechanism of the labour by so far converting the entrance and passage of the child's head into the contracted pelvic brim, from a matter of comparative chance into a matter of comparative certainty; but further, we effect thus, in the course of minutes, by turning, what it might require the course of hours or days to accomplish, provided the transit of the fœtal head were left as a head-presentation to nature alone, or to nature assisted at last artificially by the long forceps or crotchet.

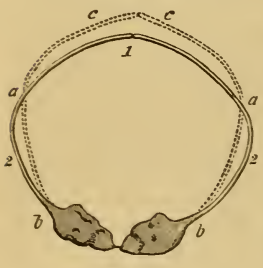

Fig. 12.

Fig. 12. Illustrating the effect of pressure upon the top of the arch of the fœtal cranium, as happens when the head presents. The dotted line, *c b b c*, is the vertical section of a normal fœtal skull, as seen in Fig. 11. The outline, 1 2 2, shows the disadvantageous alteration in form produced by the presentation of the head to a contracted pelvis.

But other advantages are obtained by turning, as compared with embryulcio and the long forceps, in the class of cases which we are considering. We not only bring the tapering or cone-shaped fœtal head through the distorted brim, by making its narrow extremity enter first into the contracted aperture, and *afterwards* using the sides of that aperture to compress the elastic parietes of the broader and higher part of the cranium, but in some cases we in this way, I believe, eschew altogether engaging the broadest part of the head (*a a*, Fig. 12), in the narrowest part of the contracted pelvic opening—a circumstance and adjustment that, in a head-presentation, would be otherwise quite unavoidable. For, besides being found of a conical form when looked at vertically, the infantile head shows the same configuration also when viewed antero-posteriorly. The accompanying outline, for instance, of the fœtal head, as seen from above, is an exact copy of that given in Chailly's late work on Midwifery, and shows that while the head is very broad behind in its bi-parietal diameter (*a a*, Fig. 13), it gradually tapers and diminishes in breadth as we proceed forward to its bi-temporal and bi-frontal (*b b*) diameters; and its bi-temporal diameter is in general fully half-an-inch less than its bi-parietal. But, in the mechanism of head cases, the neck, as is well known, becomes early flexed in the labour, so that the chin is brought towards the top of the sternum, and the vertex or upper and back portion of the head first becomes pushed downwards into the pelvic aperture, and thus constitutes the presenting part—in other words, the broadest part of the cone of the whole child, because the broadest part of the head, or its bi-parietal diameter, is thus naturally first driven downwards into the pelvic cavity, and is first directed against the contracted brim. The same head, when extracted as a footling presentation through the same distorted pelvis, will in some instances entirely escape having this, its broadest part, placed and engaged in the narrowest part of the pelvic aperture; for, as the extremities and the body of the child are gradually extracted in the operation of turning, the head, in ultimately adapting itself to the shape of the pelvis, comes to have its bi-temporal, and not its bi-parietal, diameter implicated in

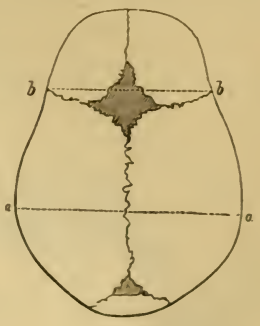

Fig. 13.

Fig. 13. Outline of the fœtal head as seen from above.—(From Chailly.)

the narrowest or conjugate diameter, the parietal protuberances passing into the wider lateral space opposite the sacro-iliac synchondrosis. That such is the fact, the position of the mark or indentation upon the skull, produced by compression against the protruding promontory of the sacrum in Case I., and in other instances which I shall afterwards quote, amply proves.[1] The injury and depression of the cranium, if any, seems always situated before the ear, and consequently much before the parietal protuberance; or, in other words, it is, as I have said, in the temporal region. The anterior edge of the parietal bone, or the anterior edge of it and the corresponding posterior edge of the frontal, are generally the osseous points that are depressed and indented, as represented in the accompanying diagram.

Now, the child's head narrows greatly from behind forwards, from the occiput towards the forehead, as seen in Figure 13; and

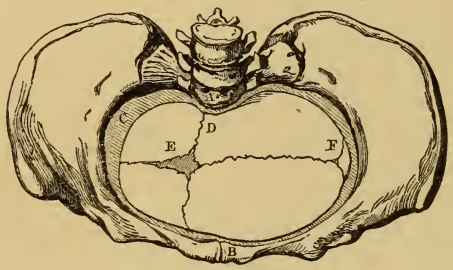

Fig. 14.

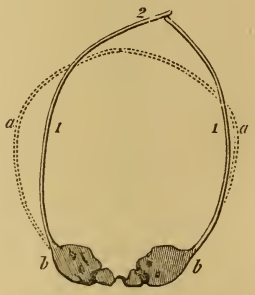

Fig. 15.

in the temporal region its diameter is generally from three to five eighths of an inch, or from four and a half to seven and a half lines

Fig. 14. The form in which the bones of the fœtal cranium are compressed in passing through a contracted brim. A. Promontory of sacrum. B. Symphysis pubis. C. Unoccupied space between the ilium and forehead of the child. D. Depression in child's head corresponding to the promontory of the sacrum. E. Anterior fontanelle. F. Posterior fontanelle.

Fig. 15. Illustrating the effect of lateral compression upon the sides of the arch of the fœtal cranium, as happens when the child is extracted footling. The dotted line, *a b a b*, is the vertical section of a normal fœtal skull, as seen in Fig. 11. The outline, 1 2 1, shows the advantageous alteration in form produced upon the fœtal cranium by extracting the child footling through a contracted pelvis.

[1] See, for example, the figures of indented fœtal skulls given by Professor Sandifort, in pl. xxxiv. of vol. ii. of his *Museum Anatomicum*.

less than between the two parietal protuberances.[1] Hence it is evident that a great gain is effected by the head passing through the narrowest part of the brim, with a diameter at least several lines less than it otherwise would offer, provided it happened that the vertex of the head had been kept and retained as the presenting part.

In order that the full-sized fœtal head may pass through a contracted pelvic brim, we require to have the head flattened laterally, and its sides at its anterior parietal or temporal region collapsed and compressed. The outline, *a b a b*, Fig. 15, is the outline of the vertical section of the infant's skull that I have already given in Fig. 11. The line, 1 2 1, marks what we may presume, for the sake of illustration, to be the shape and degree of compression to which the head would require to be reduced in order to pass the contracted pelvic aperture.

Would this necessary degree of compression be effected more easily and by less amount of force if the head were drawn through the narrow pelvis as a footling presentation, than if it were driven into it as a cephalic presentation? I certainly believe that less power would be required to produce the same degree of lateral compression and collapse in the cranial arch, provided the compressing force were applied, as in cases in which the child is extracted footling, directly to the two sides or lateral surfaces (1 1, Fig. 15) of the arch itself, than under the alternative condition supposed. For if the child descended into the pelvic brim as a head presentation, the uterine contractions would drive it against the narrow points of the pelvic brim, so that the reacting compressing power of these points would be applied either to the two upper surfaces of the arch (*c c*, Fig. 12), or partly to one of them (*c*), and partly to one of its opposite lateral surfaces (*a a*, Fig. 15). In such circumstances the compressing powers would be acting much more indirectly, and far more at a disadvantage in effecting the required compression, than if they were applied, as in extracting the child footling, directly and immediately to the sides themselves (*a a*, Fig. 15) that are to be compressed.

"Does the head," asks Dr. Radford, "elongate more readily upwards than downwards? If only," he answers, "the same degree of extractile force is used, it does not." But what I have stated

[1] See preceding note from Dr. Burns' *Midwifery*. Chailly gives the bi-parietal diameter as three inches and a quarter (3¼) to three inches and a half (3½); and the bi-temporal diameter as two inches and a half (2½) to three inches (3).—See his *Treatise on Midwifery*, 1844, translated by Dr. Bedford, p. 62.

shows that the same degree of extractile force will produce the desired effect more easily, and as we shall afterwards see, more safely also, when the child passes with the pelvis, than when it passes with the head first. And this I believe, affords us another advantage in the mechanism of footling as compared with cephalic presentations in instances of diminished pelvic brim. We are enabled to produce by it the same amount of compression of the fœtal head by a less expenditure of compressing force, for we apply it to the lateral surfaces or piers of the cranial arch (*a a*, Fig. 15), and not to its pedentures or upper surfaces (*c c*, Fig. 12). We effect a saving of force by the *direction* in which we apply the force.

I am well aware both that it is exceedingly difficult to state accurately and intelligibly the opinions one may happen to entertain on such a subject as we have been discussing in the present section, and that I am far from having succeeded in making the demonstration so simple as I could wish. It may assist, however, our comprehension of the matter if, before concluding it, we try to recapitulate and sum up the advantages which, in regard to the mechanism of labour, are, in the contracted states of the pelvic brim, obtained by the child passing as a footling instead of as a cephalic presentation. These advantages, as far as I have hitherto attempted to trace them in the preceding remarks, for we shall trace out more of them afterwards, amount to the following:—

1. The fœtal cranium is of a conical form, enlarging from below upwards, and when the child passes as a footling presentation, the lower and narrower part of the cone-shaped head is generally quite small enough to enter and engage in the contracted pelvic brim.

2. The hold which we have of the protruded body of the child, after its extremities and trunk are born, gives us the power of employing so much extractive force and traction at the engaged fœtal head, as to make the elastic sides of the upper and broader portion of the cone (viz. the bi-parietal diameter of the cranium) become compressed, and, if necessary, indented, between the opposite parts of the contracted pelvic brim, to such a degree as to allow the transit of the entire volume of the head.

3. The head, in being dragged downwards into the distorted pelvis, generally arranges itself, or may be artificially adjusted, so that its narrow bi-temporal, instead of its bi-parietal, diameter, becomes engaged in the most contracted diameter of the pelvic brim.

4. The arch of the cranium or head is more readily compressed

to the flattened form and size required for its passage through a contracted brim, by having the compressing power applied, as in footling presentations and extraction, directly to its sides or lateral surfaces, than by having it applied, as in cephalic presentations, partly to the lateral and partly to the upper surfaces of the arch.

Lastly, I may add, as a result of the whole mechanism, that the *duration* of the efforts and sufferings of the mother is greatly abridged by turning, when used as an alternative for craniotomy and the long forceps, and that thereby her chances of recovery and safety are increased. But as this is itself a matter of the highest moment, in reference to the whole question of the proposed practice, we shall devote a special section to the consideration of it.

Section IV.—The Duration, and consequently the Danger, of the Labour is decreased by the proposed Practice.[1]

In the short summary which I gave in January last of the advantages of turning, over embryulcio, I stated one strong reason in favour of delivery by the alternate operation to be this—"*that it was more safe to the mother, because it could be performed earlier in the labour, and more speedily,*"[2] than craniotomy, or the application of the long forceps. And I have the most sincere belief that the practice I propose may be the means of saving much, both of maternal and infantile life, by enabling us in some cases to abridge the mere duration of a difficult labour, so that we may terminate in a few minutes a delivery, which, under other plans of treatment, might still be protracted onwards for hours or even for days. At the same time I am fully aware that when I state my conviction that the mere degree of *duration* and continuance of a labour is, *per se*, dangerous both to the mother and child, and very often fatal even in its influence, I venture to broach a doctrine which stands up alike against the opinion and the practice of some of the highest authorities in the obstetric profession.

About half-a-century ago, when treating of the influence of the duration of labour in difficult and instrumental deliveries, Dr. Osborne observed—"I believe it is confirmed by general observation, that women recover at least as well, after long, lingering, and laborious labours, the duration of which may have been extended to several days, as after the easiest, quickest, and most natural

[1] See *Provincial Medical and Surgical Journal*, February 9, 1848, p. 57.

[2] *Monthly Journal of Medical Science*, March 1847, p. 718.

delivery."[1] In making this remark, Dr. Osborne stated not his own opinion only, but, I believe, the general opinion of the accoucheurs of his time; and the same doctrine, little or not at all modified, still continues to be taught and acted upon, down to the present day, in the great English and Irish schools of midwifery, as the able and excellent writings of, for example, Professors Davis and Murphy in London, and Drs. Collins and Beatty in Dublin, etc., fully testify.

That, *per se*, the duration of labour has no very direct nor decisive influence upon the degree of danger and fatality accompanying parturition, is a doctrine which probably originated in, and has been perpetuated by, an erroneous system of observation. In founding and supporting it, obstetricians have, I believe, drawn their deductions, not from the *whole* of their practice, but from *parts* only of it; they have not reckoned upon the certain results of their *general* collection of facts, but depended upon the fallacious results of isolated and *individual* instances; they have not, in short, counted up the terminations and consequences of *all* their protracted cases, but have relied upon the evidence of some *single* striking case or cases of perfect, and it may be, rapid recovery after labour of a very prolonged duration. In proceeding thus, obstetric authors have not followed a course altogether different from that pursued in the study and investigation of many other similar questions in medical science and practice. For confessedly, the medical mind has ever been too apt to recollect and reason upon those facts only which are in favour of any preconceived opinion or opinions it may chance to have adopted; and the cases of failure are too often forgotten amid the more agreeable remembrance of the cases of success. It is on this account that the numerical method of reasoning and investigation, by obliging us to count up *all* our cases, and *all* our results, whether good or bad—whether instances of recovery or instances of death—is no doubt destined to revolutionise, in a great degree, our modes of inquiry, particularly in surgery and midwifery, by imparting infinitely more precision and certainty to our present deductions and precepts where they are true, and showing us, in language that cannot be misunderstood, the erroneousness of our doctrines where they are not true.

The question of the duration of labour in relation to its effects upon the danger and mortality accompanying parturition will be found, in my humble opinion, to afford an apposite example of the

[1] *Essays on the Practice of Midwifery in Natural and Difficult Labours*, p. 66.

truth of these remarks; for when this question is examined—as it can alone properly be examined—by the numerical or statistical method, the results that are thus yielded assuredly directly gainsay and contradict the accredited impressions and common belief of the profession upon the subject. With the exception of Dr. Collins of Dublin, few, or indeed no writers have, in their obstetric reports of hospital or private practice, furnished us with data showing the duration of labour either in their natural or in their operative cases of midwifery. In his *Practical Treatise on Midwifery* (a work, the great value and candour of the facts contained in which it would be difficult to overpraise) Dr. Collins has given the result of the cases which occurred in the Dublin Lying-in Hospital during a period of seven years, commencing November 1826, and he has published throughout the work, and especially at the end of its individual chapters, tables and data, from which the duration of the labour in most cases and complications can easily be calculated and compared. I shall state briefly some of the results regarding the influence of the duration of labour which I have obtained by summing and counting up the individual facts and data which Dr. Collins has published. And the results which I have in this way obtained will, no doubt, be regarded by some as the more valuable and trustworthy, seeing that the data from which they are calculated have been collated by Dr. Collins, and given by him to the world under the generally prevailing idea that the mere length of the labour was no guide or test of its danger or mortality.

During the seven years that Dr. Collins had charge of the Dublin Lying-in Hospital, 16,414 women were delivered in it; and of these 164 died, or one in every hundred of the mothers was lost. In 15,850 of these cases the duration of the labour has been marked and published; in 1 in 29 only it was not noted. Out of the 164 fatal cases, in 138 the duration of the labour has been marked and published; in 1 in 6 it was not noted. Now if, in relation to the duration of labour as bearing upon the maternal mortality, we calculate the proportion of the 138 maternal to the whole 15,850 labours, I find that the interesting result is that which is shown in the following table. Let me merely premise that the table reads as follows:—Out of all the women delivered within one hour, 1 in 322 died; out of all those in whom the labour continued from two to three hours, 1 in 231 died; and so on.

TABLE II.

SHOWING THE PROPORTION OF MATERNAL DEATHS IN RELATION TO THE DURATION OF LABOUR IN 15,850 CASES OF DELIVERY.

Duration of Labour.	Proportion of Mothers Lost.
Within 1 hour	One in 322 died.
From 2 to 3 hours	,, in 231 ,,
,, 4 to 6 ,,	,, in 134 ,,
,, 7 to 12 ,,	,, in 80 ,,
,, 13 to 24 ,,	,, in 26 ,,
,, 25 to 36 ,,	,, in 17 ,,
Above 36 hours . .	,, in 6 ,,

The preceding table affords ample evidence that, contrary to the general opinion of the obstetric profession, the mere length of the labour is a most serious and important element in reference to the degree of danger and fatality accompanying the process. For, in fact, as shown by these calculations, "*the mortality attendant upon parturition increases in a ratio progressive with the increased duration of the labour.*"[1] And this does not hold true with regard to the life of the mother alone. It equally holds true with regard to the life of the infant. For, exactly in the same way, as proved from the

[1] The law itself—and I believe it to be a most important one—was originally educed by a series of calculations from Dr. Collins' cases. I formerly published merely the *results* of the calculation, without publishing the *data* on which these results were founded; for my object was not to overload my paper, or the pages of the Journal, unnecessarily. As Dr. Collins believes, however, that these results are obscure, I shall simply insert, in a tabular form, the data themselves upon which this law and its results were founded.

TABLE showing the Proportion of 138 Maternal Deaths in Relation to the Duration of Labour in 15,850 Cases of Delivery recorded by Dr. Collins.

Duration of Labour.	Number of Deliveries.	Number of Deaths.	Proportion of Deaths.
Within 1 hour	3,537	11	1 in 322
From 2 to 3 hours	6,000	26	1 in 231
,, 4 to 6 ,,	3,875	29	1 in 134
,, 7 to 12 ,,	1,672	21	1 in 80
,, 13 to 24 ,,	502	19	1 in 26
,, 25 to 36 ,,	134	8	1 in 17
Above 36 hours . .	130	24	1 in 6
Total	15,850	138	1 in 115

Out of Dr. Collins' 16,414 cases, he noted the duration of the labour in 15,850; and among these 15,850 cases, 138 maternal deaths occurred. The preceding table contains, in its first column of figures, the total number of deliveries that took place under each specified period of duration; in the second column is stated

same collection of data, I find also that, as a general fact, "*the infantile mortality attendant upon parturition increases in a ratio progressive with the increased duration of the labour.*" Dr. Collins reports 1121 children as having been still-born. In 1045 of these cases, the duration of the labour was noted. The following table shows the proportion of the children lost in labours of different degrees of duration. Like the preceding table, it reads thus:—Out of all the women delivered within two hours, one in twenty of the children was lost; out of all the women whose labour endured from three to six hours, one in eighteen of the children was lost; and so on.

TABLE III.

SHOWING THE PROPORTION OF INFANTILE DEATHS IN RELATION TO THE DURATION OF LABOUR IN 15,850 CASES OF DELIVERY.[1]

Duration of Labour.	Number of Infants still-born.
From 1 to 2 hours	One in 20 was lost.
„ 3 to 6 „	„ in 18 „
„ 7 to 12 „	„ in 11 „
„ 13 to 24 „	„ in 6 „
„ 25 to 36 „	„ in 3 „
Above 36 hours . .	„ in 2 „

The two preceding tables refer to the proportion of maternal and infantile deaths as regulated by the duration of the labour. But many morbid complications and accidents may arise during parturition, without necessarily proving fatal either to the mother or infant. The occurrence, however, of these complications and accidents is regulated by the same law of duration as I have above shown to regulate the actual deaths of the mother and children. For, exactly in the same way, it may be laid down as a general proposition, that "*the liability to most of the morbid complications connected with labour*

the corresponding number of deaths occurring among each set of these deliveries; and in the third column is given the proportion which the deaths bear to the whole deliveries in labours of each specified degree of duration. In other words, the table reads thus:*—3537 mothers had their labours terminated within one hour from their commencement; and of these 3537 mothers 11 died, or 1 in every 322. The labour continued from 2 to 3 hours in 6000 cases, and out of these 6000 cases 26 mothers died, or 1 in every 231; and so on.—Letter to Dr. Collins. *Prov. Med. and Surg. Journal*, Nov. 1848.

[1] The above rule is merely a simple generalisation of Dr. Collins' own experience and cases, as will be seen in the following table, also deduced from Dr. Collins' own data:—

* The other tables that follow are constructed on the same plan, and read in the same way.

increases in proportion as the labour is increased in its duration."[1] It would be easy to demonstrate, for instance, that this holds good with regard to various obstetric complications taken individually—such as convulsions, rupture of the uterus, retention of the placenta, or hemorrhage before and after its removal, puerperal fevers, puerperal inflammations, etc. The liability to each one of these complications and results certainly increases with the length of the process of parturition. But it may be enough for my present purpose to show that, taking these complications collectively, such is the result: the tendency to their general occurrence becomes greater and greater in proportion as the length of the labour is allowed to become greater and greater.

TABLE showing the proportion of Still-births in reference to the Duration of Labour in 15,850 Cases of Delivery.

Duration of Labour.	Number of Deliveries.	Number of Still-born Children.	Proportion of Still-born Children.
Within 2 hours	7,050	347	1 in 23
From 3 to 6 hours	6,362	346	1 in 18
„ 7 to 12 „	1,672	151	1 in 11
„ 13 to 24 „	502	88	1 in 6
„ 25 to 36 „	134	42	1 in 3
Above 36 hours . .	130	71	1 in 2
Total . . .	15,850	1045	1 in 15

Dr. Collins also reported 284 cases of death of the child subsequent to birth.

If we throw out of these 284 cases the premature or twin children, as too small in size to be influenced much in their passage during labour, and those born imperfect or diseased, we have 155 children left, born at the full time, and apparently perfect in formation at birth. The following table of these cases will prove that tedious and protracted labour is also *a cause of death to the child after birth.*

TABLE of Duration of Labour in 155 Deliveries where the Children died within a few Days after Birth. (From Dr. Collins' data.)

Duration of Labour.	Number of Deliveries.	Number of Deaths.	Proportion of Deaths.
Within 6 hours . .	13,412	110	1 in 122
From 7 to 12 hours .	1,672	24	1 in 70
Above 12 hours . .	766	21	1 in 36
Total . . .	15,850	155	1 in 102

—Letter to Dr. Collins.

[1] Dr. Collins remarks that this does not accord with his experience. But his own facts and data show the opinion to be true. The following table is a brief

In his *Treatise*, Dr. Collins has recorded the duration of the labour in 24 cases of puerperal convulsions; in 24 cases of rupture of the uterus and vagina; in 62 cases of retention of the placenta; in 102 cases during and after the third stage of labour; in 84 cases of puerperal fever; in 5 cases of fatal pelvic abscess; and in 5 fatal cases of inflammation and sloughing of the vagina; in all, 306 cases of complication occurring in 296 patients. The following table shows the proportion in which these 306 complications occurred in labours of different durations. It reads thus:—Of all the women who were delivered within one hour after the commencement of labour, one in 114 suffered from one or other of these obstetric complications; of all those whose labours were prolonged from one to two hours, one in 90 suffered from one or other of these complications; and so on.

TABLE IV.

SHOWING THE PROPORTION IN WHICH 306 MORBID COMPLICATIONS OCCURRED IN 15,850 LABOURS OF DIFFERENT DURATIONS.

Duration of Labour.	Proportion of Complications.
Within 1 hour . . .	One in 114 was complicated.
From 1 to 2 hours .	„ in 90 „
„ 2 to 3 „	„ in 69 „
„ 4 to 6 „	„ in 58 „
„ 7 to 12 „	„ in 32 „
„ 13 to 24 „	„ in 12 „
„ 25 to 36 „	„ in 9 „
Above 36 „	„ in 5 „

The evidence which I have adduced in the preceding tables affords ample proof that the proportion of maternal and infantile deaths, and

way of expressing these data in reference to the eighty-four cases of puerperal fever, in which the previous duration of the labour was noted by him, and it sufficiently shows that the liability to this, like other complications, increases as the labour increases in duration :—

TABLE of Duration of Labour in 84 Cases of Puerperal Fever, in the Dublin Hospital, during Dr. Collins' Mastership.

Duration of Labour.	Number of Deliveries.	Number of Cases.	Proportion of Cases.
Within 6 hours . .	13,412	61	1 in 219
From 7 to 12 hours .	1,672	10	1 in 167
Above 12 hours . .	766	13	1 in 59
Total . . .	15,850	84	1 in 186

One fundamental mistake in his statistics and calculations led Dr. Collins into

of obstetric complications, becomes, as a *general law*, gradually more and more numerous as the process of labour becomes more and more prolonged in its duration. But I have brought forward the facts principally for the purpose of showing that out of them, and in connection with them, there is deducible another all-important principle, in reference to a practical and operative obstetric inquiry of the present nature—viz. that when operative interference, such as the forceps, crotchet, turning, etc., is required, in order to terminate a difficult and morbid labour, the *time* of the labour at which that interference is had recourse to, regulates the amount of attendant danger much more than the details and effects of the operation itself. In other words, in accordance with the general law already illustrated, the extent of danger or fatality attendant upon operative and instrumental delivery is regulated in a direct and demonstrable degree by the previous length of time allowed to elapse before the

numerous errors and inaccuracies relative to the effects arising from the morbid protraction of labour. This error has made him repeatedly express and maintain, as the supposed result of his own facts and experience, opinions which his own facts and experience, when properly interpreted, totally and altogether contradict.

The error I allude to is this:—In calculating from his experience of 16,414 deliveries, the effects upon the maternal mortality of morbid prolongation of the labour as a special or individual complication, he calculates the resulting number of deaths in relation to the *total sum of all the cases delivered* (16,414), instead of calculating them in relation to the *total sum of all the cases merely that were protracted* (452); he calculates the effects of the complication relatively to the whole number of cases of delivery, instead of relatively to the whole number of cases of this special complication (protraction). An example may illustrate my meaning. I shall take it from the subject of rupture of the uterus and vagina.

During Dr. Collins' seven years' mastership of the Dublin Hospital, 34 cases of rupture of the uterus and vagina occurred, and 32 of the mothers died; 2 only of the 34 survived. If he argued upon this special complication as he does with regard to the special complication of protraction, he would maintain that the mortality from rupture was strikingly small; for only 32 mothers out of 16,414, or about 1 in every 513, died of it. This would show, certainly, the proportion of deaths from rupture in relation to the total sum of all the cases delivered; but it would not show what was wanted—viz. the proportion of deaths from rupture in relation to the total sum of all the cases in which rupture happened. If he wished, in short, to state the real risk and danger attendant upon this special complication, rupture, he should state that 32 mothers died of it out of 34 cases in which it occurred, instead of stating that only 1 in 513 died of it. And exactly in the same way, if asked what was the degree of maternal risk and danger attendant upon another special complication, viz. protraction of labour beyond twenty hours, his answer upon the same principle should not have been 42 deaths in 16,414 labours, or in the proportion of 1 in 391; but 42 deaths in 452 labours, the whole number protracted beyond twenty hours, or 1 death in every 11 cases of labour prolonged to this amount of protraction.—See Letters to Dr. Collins. *Prov. Med. and Surg. Journal*, Nov. and Dec. 1848, pp. 601 and 683.

artificial interference is had recourse to; the resulting mortality increasing in amount according as the period at which the operation is performed is proportionally more distant from the date of the first commencement of the labour.

It is not in my power to prove from Dr. Collins' *Treatise* that this law holds true in regard to the alternative operation of delivery by the long forceps, for his work affords no data on this point. In fact, in instances in which the head of the child is arrested at the brim, he and the profession generally in Dublin prefer the use of the perforator to the use of the long forceps; and during the course of the seven years throughout which his report extends, this latter instrument does not seem to have been employed once in the Dublin Hospital, while craniotomy was, during the same period, employed above eighty times. During these seven years, however, the short forceps were used to terminate the delivery in twenty-four patients in whom the head was sufficiently low down in the maternal passages; and perhaps the results in these twenty-four cases will be regarded as a sufficient illustration that in forceps operations the general law holds good, that "*the operation is dangerous and fatal in proportion to the length of labour allowed to elapse before the artificial delivery is practised.*"

TABLE V.

SHOWING THE MATERNAL MORTALITY ATTENDANT UPON 24 FORCEPS OPERATIONS TO BE REGULATED BY THE PREVIOUS DEGREE OF DURATION OF THE LABOUR.

Date of Operation.	Results to the Mothers.
In labours terminated within 24 hours .	One out of 13 died[1]
In labours terminated in from 25 to 36 hours	,, 6 ,,
In labours terminated in from 37 to 48 hours	,, 4 ,,
In labours terminated in above 48 hours .	,, 2 ,,

Dr. Collins' data regarding the operation of craniotomy are more extensive, and hence more valuable. During the seven years included in his report, perforation of the head of the infant was practised in eighty-five cases in which there was extreme difficulty in the labour, or where the child was dead, and interference necessary for the

[1] In the single fatal case of forceps operation out of thirteen in which the women were delivered before the labour had continued twenty-four hours, the mother became insensible after the pains had set in for a few hours, and the instruments were apparently used in consequence. The whole labour was only of eight hours' duration. She died in three hours after delivery.

patient's safety, or for the full completion of the delivery. In seventy-six out of these eighty-five cases, data are afforded for ascertaining the duration of the labour.

Out of the seventy-six women, fourteen, or one in every five and a half, died. The following table of the results of these seventy-six cases of craniotomy, as influenced by the previous duration of the labour, affords direct evidence of the proposition which I have already stated, that the fatality attendant upon this, as upon the other allied forms of forced or artificial delivery, is regulated by the date or period of the labour at which the operative interference is had recourse to.

TABLE VI.

SHOWING THE MATERNAL MORTALITY ATTENDANT UPON 76 CRANIOTOMY OPERATIONS TO BE REGULATED BY THE PREVIOUS DEGREE OF DURATION OF THE LABOUR.

Date of Operation.	Results to the Mothers.
In labours under 24 hours .	One out of 19 died
,, from 25 to 48 hours	,, 8 ,,
,, above 48 hours .	,, 3 ,,

The preceding body of evidence might easily be rendered more minute and detailed if it were necessary. But I hold that it affords proofs sufficiently strong and direct for our present inquiry. And the important relations which it has to that inquiry amount to this, that the facts adduced demonstrate—

1*st.* That, as a general law, the amount and proportion of maternal and infantile deaths accompanying parturition are regulated and modified by the length and duration of the labour.

2*d.* That the liability to various morbid obstetric complications during and after delivery is modified and regulated by the same law; and,

3*d.* That the mortality attendant upon obstetric operations, such as the use of the forceps and crotchet, is also strictly modified and regulated by it—operative delivery being more and more fatal in proportion to the lateness in the course of the labour at which it is adopted; and, on the other hand, less and less fatal in proportion to the earliness in the course of the labour at which it is practised.

Now, the object of the present memoir is to propose that in cases of arrestment of the head at the brim of the pelvis, artificial delivery should be accomplished by turning, instead of by the long forceps

or craniotomy. And the operation which I thus wish to substitute has, as I have stated at the commencement of this section, this great and high advantage over both the two others, for which I propose it as an alternative, that, *cæteris paribus*, delivery by turning can, and must, as a general rule, be practised far earlier in the labour, than delivery either by the long forceps or the crotchet; and in proportion as it is practised earlier, so far also will it be attended by greater safety and greater success. A few remarks upon the time at which the employment of the long forceps or perforator is usually adopted will render this deduction more evident. In our next communication we shall consider this point, and the value of auscultation in relation to operative delivery.

Sect. V. — Relative Periods of the Labour at which the Long Forceps, Perforation, and Turning, are respectively employed: Value of Auscultation in Operative Deliveries.[1]

In the preceding section I have attempted to show the comparative advantage of turning over the employment of the long forceps or crotchet, on the ground that we could thus accomplish the delivery much earlier in the course of the labour, and hence much more safely for the mother. In fact, when the long forceps are used in instances of arrestment of the head at the brim, they are in general never applied till the cranium is thrust and wedged down into the upper pelvic aperture to as great an extent as can possibly be effected by the unassisted uterine efforts, and till symptoms of local irritation, or constitutional reaction or exhaustion, offer to appear. But before all this state of matters is brought about, both much expenditure of muscular and vital exertion on the part of the mother, and also much expenditure of time, is usually required; and the walls of the maternal passages are liable to have become injured by irritation and compression. Before the assigned conditions are produced, many long hours commonly elapse, each one of them directly and rapidly adding to the chances of danger to the mother. On the other hand, in the same set of cases, if artificial delivery by turning were adopted, it might and would be practised as early as the passages were adequately dilated, before the head was pushed down into the pelvic brim, and long before any symptoms of local lesion or general irritation and exhaustion presented themselves.

[1] See *Provincial Medical and Surgical Journal*, February 23, 1848, p. 85.

But it is principally as a substitute for craniotomy that I venture to suggest the operation of turning in instances of arrestment of the head at or above the brim of the pelvis. And when we contrast the different times, as far as regards the duration of labour, at which these two modes of delivery (craniotomy and turning) would be respectively followed in the same class of cases, we shall perceive still more strongly the advantages of the alternative practice. For turning, as I have just now stated, would necessarily be performed early in the course of the labour, and so far at a period when the danger would be comparatively slight, according to the law of duration which I have attempted to establish. Commit, however, the same morbid cases to the usual rules of management, by which they would be treated under the prospective idea that they would in all probability ultimately become cases of craniotomy, and mark the difference. The labour is allowed to go on from hour to hour, and possibly for one or two long and weary days, in order to give the child every legitimate chance of being at last expelled alive, or, at least, expelled without operative mutilation. In the meantime, however, as the preceding tables abundantly prove, the chance of immediate or ultimate danger to both mother and infant increases fearfully in proportion as the labour drags on its duration. How long, then, shall we allow it to continue before we perforate and break up the child's head? Most modern authorities would answer that question by earnestly inculcating the propriety of not applying the perforator till the child were distinctly and certainly dead, unless, indeed, the appearances of danger to the mother were extremely marked and imminent, for almost all eagerly and properly declare their abhorrence at the idea of "plunging an iron instrument into the centre of the skull of a living human being."

But how long must we probably wait before the child really dies? We have seen (Table III.) that the infantile, like the maternal, mortality increases in a ratio progressive with the increased length of the labour; and that out of all cases in which, in the Dublin Hospital, the process of parturition was prolonged beyond thirty-six hours, one in every two of the children was lost. But still the labour may go on to the fortieth, fiftieth, or sixtieth hour, and yet the child live. Out of twenty-seven cases in all, reported by Dr. Collins, in which the labour was prolonged to sixty hours and upwards, in sixteen the child was ultimately born dead; and in the remaining eleven it seems to have still survived, and ultimately to have been expelled alive. Whilst, however, we are thus waiting

and watching for the certainty of the child's death *before* we operate, the chance of the mother's death increases with the lapse of every hour. Out of these same twenty-seven cases of labour prolonged sixty hours or upwards, seven of the mothers, or one in every four, perished. We may thus wait with the expectation of the infant's death, till at last we run the imminent hazard of also losing the mother; and even then, when at last we find ourselves driven to have recourse to craniotomy in order not to place the parent in greater jeopardy, we may be unwillingly compelled to practise the operation while the child still really lives, goaded on by a dire, but now irresistible necessity, to attempt to save the life of the mother by taking away the life of her child.

Auscultation is the criterion upon which all modern accoucheurs properly and mainly depend for ascertaining the death of the infant, and fixing the date at which it threatens to perish, or actually does perish, during a protracted labour. And certainly, in the progress of a prolonged case, auscultation is, as Dr. Collins states, of "immense value in ascertaining the life or death of the child." "I know," he remarks, "of no case where the advantage derived from the use of the stethoscope is more fully demonstrated than in the information it enables us to arrive at with regard to the life or death of the fœtus, in the progress of tedious and difficult labours. It is, in my opinion, one of the greatest improvements made in the practice of midwifery."[1] The whole evidence of Dr. Collins' general remarks and individual cases shows, that in protracted parturition the special advantage which he has found, and expects others to find, from the employment of auscultation, is a far more precise and certain knowledge than we could otherwise possess, of the life or death of the infant, and of the exact time at which it does die, with a view of fixing more exactly the time at which we should deliver it by craniotomy. Actuated by the best and most humane feelings, Dr. Collins believes that in tedious and difficult labours, obstetricians should rarely or never perform craniotomy upon the head of a *living* child, and that auscultation will enable us to eschew this otherwise unavoidable error. For, in one set of cases, it will show us the propriety of postponing the operation, by showing us that the child's heart is still beating. In another set of cases it will show us the propriety of practising it earlier than we should otherwise do, by showing us that the child is already dead. At the same time, we must still not use our perforator immediately

[1] *Practical Treatise*, p. 18.

after the fœtal heart ceases to be heard by the stethoscope, or indeed for some hours afterwards, lest life be not perfectly and entirely extinct in the child. "It is totally contrary," says Dr. Collins,[1] "to every rule of practice, to deliver the patient with the crotchet when the fœtal heart's action *first* becomes inaudible. It is only after frequent examinations, with some interval between each, that this is ever resorted to, except where the mother's life is in *very imminent danger* indeed."

Such is the use and value of auscultation in protracted labours, according to the opinion of Dr. Collins and of the Dublin school generally; and certainly, while for one, I most gladly and gratefully acknowledge that it is to that school that British midwifery stands indebted for the first introduction of auscultation into English obstetric practice, still I cannot help declaring my conscientious conviction here, as I have often done in lecturing upon the subject, that the preceding application of it in tedious labours is so far undoubtedly erroneous in two most important and fundamental points.

Errors in Practical Application of Auscultation.

For, *first*, according to the principles upon which the Dublin practitioners use auscultation in tedious labour—viz. in order to fix the fact of the death or life of the child, with a view to the immediate performance or further postponement of craniotomy—they altogether leave out of consideration the great influence which the mere duration of the labour exerts upon the maternal constitution and life. They forget that, whilst they are delaying for the death of the child, the very delay is rapidly destroying the mother;—whilst they are waiting and watching for the fœtal life to become extinct, the maternal life is every hour becoming placed in greater and greater danger. "Under proper management," argues Dr. Collins, "the death of the child takes place in laborious and difficult labours before the symptoms become so alarming as to cause any experienced physician to open its head for the sake of the safety of the mother." But I believe his own facts totally and sternly contradict this argument. When for this or other causes he waited till the labour had continued from twenty-five to thirty-six hours from its first commencement, one in every seventeen of the mothers died (see Table II.); when he waited for twelve hours longer, allowing the labour to be prolonged from thirty-seven to forty-eight hours, then one in every six of the mothers was lost; when he waited for

[1] *Dublin Medical Journal*, vol. xiii. 1838, p. 423.

twelve more hours (namely, forty-nine to sixty hours), then one in every five of the mothers was lost; and when interference was not adopted, or delivery completed, till the labour had gone on for sixty hours or upwards, then one in every four of the mothers perished; and that too, although, as we have already seen, in eleven out of twenty-seven cases, or in about one in two and a half of these very same protracted labours, the child was still living, and was indeed ultimately expelled alive, thus *still* contra-indicating craniotomy, as far as its life was concerned, notwithstanding that the life of the mother was reduced to an extreme degree of danger and hazard.

But, *secondly*, the opinions which Dr. Collins and others of the Dublin school profess with regard to the application of auscultation, as a valuable aid to the management of tedious and instrumental labours, are, I conceive, still more objectionable in another point of view. In cases of protracted parturition they use the stethoscope, as we have shown, in order to ascertain the life or death of the child, and in order to decide and determine the proper time at which embryotomy should be performed. For this purpose they employ it with the special object of fixing the fact that the child is dead; and fixing, when requisite, the true time when it does die. But I am strongly of opinion that the mighty boon which auscultation offers us in protracted parturition is quite different and far more important. For it is not by any means so valuable in thus often affording us evidence that the child is dead; it is not so much of real and practical use in showing us that we may now perform embryotomy upon a dead infant, as in showing us *when*, in protracted cases, we ought to extract the child by the forceps, turning, or other safe means, if we wish to *preserve* its life, as well as the life of the mother. In this way I have repeatedly found auscultation of incalculable benefit in protracted labours, and been, I believe, enabled by its evidence alone to save several times the life of the child by the timely application of the long and short forceps. And though the principle upon which I have thus acted in the management of tedious labours is not acknowledged by Dr. Collins under that subject, yet, certainly, the very same principle of using instrumental delivery for the sake of the safety of the child is acknowledged by him under another head, and in dependence upon another form of evidence of the danger of the infant. In speaking of the treatment of cases of prolapsus of the umbilical cord he observes:[1]— "The forceps I consider highly desirable when the child is so

[1] *Practical Treatise*, p. 344.

situated that the head can be reached with safety; but as the funis generally descends at the commencement of labour, it is very seldom that this instrument is applicable till fœtal life is extinct. We should not fail, however, to apply them when practicable, should any delay occur in the delivery likely to *endanger* the life of the child, or if we find *the pulsation in the cord becoming gradually slower and more feeble.*" Now, exactly on the same principle, when in tedious labours in which there is no contra-indication, we have evidence that the life of the child is becoming endangered, when by the stethoscope we learn that the pulsations in the fœtal heart are becoming gradually slower and more feeble, it is in my opinion equally our bounden and solemn duty to interfere by the same means in order to attain the same end, viz. the preservation of the infant's life. For I hold that neither in principle nor in practice does it make any difference whether with this view we ascertain the imminent danger of the child, and the fact that the pulsations of its heart are becoming slower and more feeble, by *feeling* the pulsations of the cord, or by *listening* to the pulsations of the heart itself. The sense of hearing affords us precisely the same evidence in the one case as the sense of touch affords us in the other, and it indicates also precisely the same line of treatment.

The bearing of this long discussion and digression upon the practice of turning in contracted pelves, etc., is sufficiently evident. Over both the operations for which I propose it as a substitute—viz. delivery by the long forceps and crotchet—it possesses this great and weighty advantage, that it can be practised at a far earlier, and consequently at a far safer, period of the labour. But it is principally as an alternative for craniotomy that I feel anxious to introduce the operation of turning to the consideration of my professional brethren; and over craniotomy it possesses, in addition to the above, this other all-important advantage, that it offers the child a chance of life, while craniotomy implies the very certainty of death; and that while the existence of the sounds of the fœtal heart, and the continuance of the infant's life, would determine us to postpone, and postpone almost indefinitely, the delivery by embryulcio, the existence of these sounds, and the evidence they give of the continuance of the infant's life, would determine us to adopt, and form indeed, *cæteris paribus*, the very strongest reason for adopting, delivery by turning. In the one operation we would delay, and perhaps delay long, and hence dangerously, the delivery of the mother, because the child was living; in the other operation we would promote and

hasten the delivery of the mother on exactly the same grounds on which we postponed it in the first, viz. because the infant was still living, and might still be extracted alive.

Perhaps the detail of one or two cases may impress this view more strongly than any more lengthened remarks. I shall select the first two from the Clinical Report of Dr. Lee of London, who, like Dr. Collins, rejects the employment of the long forceps when the head is delayed at the brim, and prefers the extraction of it by the perforator and crotchet.

Case IX.—In a woman whose pelvis and extremities were distorted by rickets, the labour began on the 9th of February 1842.[1] "The membranes," to quote Dr. Lee's own words, "ruptured on the 10th. On the 11th, the os uteri was not dilated to the size of half-a-crown, the head was wholly above the brim, and the base of the sacrum easily felt. Active pains came on, and lasted during the night, and till two P.M. of the 12th. The os uteri was still very imperfectly dilated. The head, *entirely* above the brim, now much swollen. It was clearly right to interfere, which I did (by craniotomy), and she recovered without a bad symptom, though I now feel persuaded that she ought *not* to have been left so long in labour. The danger," he adds, "of rupture and fatal contusion of the uterus is great in all such cases, and delivery should be effected as soon as it is evident that the head cannot pass. I knew from the first, in this case, that it would not pass through the brim, but was *prevented from interfering in consequence of hearing the pulsations of the fœtal heart.*"

In the preceding case Dr. Lee states his conviction that the patient ought not, in reference to her own safety, to have been left so long in labour. The continuance, however, of the pulsations of the fœtal heart prevented him for some time from interfering and delivering by craniotomy. It is not stated whether the child continued alive or not till that operation was at last adopted. But the circumstance which thus directly deterred him from earlier delivery, viz. the life of the fœtus, would have directly urged him to the new practice which I am here venturing to propose in such cases. The reason he had for longer postponing the operation of craniotomy would have been the strongest of all reasons for at once preferring the operation of turning, and giving, so far, a chance of life to the child, and at the same time preventing the continued duration of the labour from placing the mother in greater danger and jeopardy.

I quote the following case from the same author for the purpose of showing what I have omitted to insist upon in the course of the preceding remarks, that in instances in which the brim of the pelvis

[1] *Clinical Midwifery*, Case 113, p. 51.

is contracted, the protracted duration of the labour may occasionally lead to the most deplorable morbid consequences on the part of the mother, even though it do not actually destroy her life. An earlier delivery by turning would, I believe, as has been already often stated, not only enable us to avoid these results to the mother, but offer a chance of escape and life to the child.

Case X.—The patient[1] had borne nine children; all her labours had been difficult, and the two last so much so that artificial assistance was required, and the children were still-born. Her tenth labour commenced on the 3d of December, and the membranes were soon after ruptured. During the 4th the pains were feeble and irregular. Thirty-five drops of laudanum were given. On the morning of the 5th they returned, but again feebly and irregularly. At ten o'clock on the evening of the 5th, two doses of the ergot were given, and soon several strong forcing pains were experienced. "The movements of the infant were not felt after this," and the uterine contractions appear to have ceased. When Dr. Lee visited her next forenoon—viz. at eleven o'clock on the morning of the 6th (three days after the labour had commenced, and the membranes had been ruptured)—the state of the patient was as follows:—"The discharge from the parts has become offensive; bladder filled with water; the vagina is swollen and tender; the head, greatly swelled and compressed, is firmly fixed in the brim of the pelvis, and the finger cannot be passed around it without giving great pain; the ear cannot be felt, the greater portion of the head being still *above* the brim." Dr. Lee opened the head, and two hours elapsed before he could complete its extraction by the crotchet. He thus continues the report:—"December 7th. A bad night; retention of urine; great swelling and tenderness of the parts; pulse rapid; tongue loaded; headach; rigors. Sloughing of the vagina took place, and on the 14th a *fistulous* communication had been formed between it and the bladder. This unfortunate woman," adds Dr. Lee, "was soon after deserted by her husband, and has led a life of great indigence and misery ever since."

In offering some general concluding remarks upon this and sixty-five other cases[2] of "difficult labour from distortion of the pelvis, etc. etc., in which delivery was effected by the operation of craniotomy," contained in his second report, Dr. Lee observes:—"In thirty-eight of the cases in this report, the labour continued from forty to seventy hours."—"In a very large proportion of the cases the difficulty arose from distortion, or a contracted state of the pelvis. Rupture of the uterus took place in three before perforation, and the inflammation and sloughing of the uterus, vagina, and rectum, which proved fatal to eight others, were chiefly or solely produced by the long-continued violent pressure on the soft parts by the head of the child *before* it was opened and extracted. In those who recovered with vesico-vaginal fistulæ or contractions of the vagina from cicatrices, the unfortunate occurrences arose from craniotomy being too long delayed."

[1] *Clinical Midwifery*, Case 84, p. 40. [2] *Ibid.* 1842, p. 59.

—"In several, had the delivery been *sooner* effected, the fatal consequences which ensued would have been wholly prevented."

In some of the following cases from Dr. Collins' report, the delivery of the patients by craniotomy was evidently postponed till such time as the child was ascertained by the stethoscope to have died. The state of the fœtal heart is not mentioned by Dr. Collins in all, but the omission was probably made in order to avoid unnecessary repetition; and, except for this counter-indicating circumstance (the continuance of fœtal life), the mothers would probably not have been allowed to have had their sufferings protracted, or so much constitutional excitement created, before resorting to artificial delivery. In the last, or last two cases, the state of the mother probably ultimately necessitated delivery, independently of any considerations relative to the life of the infant. I shall quote the cases in Dr. Collins' own words.

Case XI.—"Was admitted in labour of her eleventh child; uterine action very frequent and strong; the os uteri dilated to the size of a crown, and the fundus very much inclined to the right side. In twenty-four hours after admission (the head not having made any progress for the last eight), *the fœtal heart having ceased to act for some time*, it was thought advisable to lessen the head, and deliver with the crotchet."[1]

Case XII.—"Was admitted in labour of her seventh child; she had been delivered artificially in her previous labours, and had but one child born alive. She had been ill a considerable time before she was brought to the hospital, and in nine hours afterwards, there being no progress made, the pulse 132, her strength much exhausted, and the child *dead*, she was delivered by the crotchet."[2]

Case XIII.—"This patient was admitted in labour of her first child; uterine action was feeble, and continued so for seventy-two hours after she came in. As the *fœtal heart had ceased to act for some time*, and the pulse became hurried, it was considered advisable to deliver her. The *os uteri was not fully dilated;* the head was *high*, and resting on the pubis; it was lessened, and cautiously brought down with the crotchet."[3]

Case XIV.—"Was reported to have been in labour two days before admission; the head was high in the pelvis, and pressing strongly on the pubis. It remained in this situation for twenty-four hours after, during which time she suffered great distress, uterine action being almost constant. This was her tenth child; she had been twice force-delivered in this hospital; dreading every moment rupture of the uterus, the head was lessened and brought down by the crotchet, as it had still remained so high as to be scarcely within reach of the finger."[4]

Case XV.—"Was reported to have been twenty-four hours in labour before admission. About twelve hours after she came in, it was discovered that the face was turned towards the pubis, and pressing so strongly on the urethra that the

[1] Collins' *Practical Treatise on Midwifery*, p. 480, No. 1032.
[2] *Ibid.* p. 480, No. 1005. [3] *Ibid.* p. 481, No. 1038.
[4] *Ibid.* p. 477, No. 808.

catheter could with difficulty be passed. The pains continued strong for fifteen hours from this time, yet the head did not advance. It was deemed advisable to lessen it."[1]

Case XVI.—"Was thirty-three hours in labour of her third child, without having made the least progress for the last twelve. The bladder was forced down before the head. Her pulse became much hurried, and strength greatly exhausted, rendering immediate delivery necessary. The head was lessened, and the child brought away by the crotchet. It was very large; all her former children were still-born."[2]

Case XVII.—"S. B. was forty hours in labour; it was her fourth child; all still-born. The head not having made any progress for the last twelve hours, and the fœtal heart having ceased to act, the delivery was effected by the crotchet; the face was turned towards the pubis. She had been force-delivered in this hospital two years ago, when the face presented—(see *Observations on Still-born Children*, No 441); pelvis very defective. The placenta in the present instance had to be removed by the hand, in consequence of hemorrhage; it was firmly adherent to the fundus of the uterus. She died on the ninth day, and on examination, extensive ulceration of the vagina was found, forming a communication with the rectum. At one point the vagina presented the appearance as if a laceration had taken place."[3]

In these cases delivery by turning, instead of by craniotomy, by being performed earlier, would, I believe, have preserved the patients alike from the sufferings and the dangers which the continued duration of the labour entailed upon them; and the children, instead of being necessarily sacrificed by the operation adopted and the delay attending upon it, might possibly have been saved by the adoption of turning, and by the earlier period at which delivery could thus have been practised. But it has been doubted whether the object I have just alluded to—namely, the preservation of the infant's life—could ever be the result of forcible extraction of the child through a contracted pelvis by turning. I shall next, therefore, notice this and other objections to the proposed practice, on the allegation of danger to the mother, and disarrangement of the mechanism of parturition. The investigation of the objections urged on these several grounds will, I believe, leave us only with higher and more certain ideas of the real advantage of the proposed practice itself.

Sect. VI.—The Depression and Indentation during Labour of the Sides of the Infantile Cranium, is compatible with the Life of the Child.[4]

Among the advantages of turning as compared with embryulcio,

[1] Collins' *Practical Treatise on Midwifery*, p. 470, No. 529.
[2] *Ibid.* p. 470, No. 509. [3] *Ibid.* p. 136, No. 79.
[4] See *Provincial Medical and Surgical Journal*, March 22, 1848, p. 141.

I have stated that "it gives the child a chance of life," and that the "neck of the child, if it be living or only recently dead, is so strong as to allow us to exert such a degree of traction upon the obstructed head, that the sides of the cranium may become greatly compressed or even indented under it; and that without necessarily destroying the child."[1]

As a comment upon these statements, Dr. Radford observes, "It has been said that the neck of the child, alive or recently dead, is so strong as to allow such a degree of force to be used as to greatly compress the sides of the cranium; *but*," he adds, "*such a procedure is at variance with all scientific views, and incompatible with the safety of both mother and child.*"[2]

The accuracy or inaccuracy of the two different, and indeed opposite opinions, thus expressed upon the same point by Dr. Radford and myself, is one of those questions in pathology which no mere opinion or mere reasoning could ever settle. In order to decide it, we must have recourse to facts and experience alone. And it is of the highest moment in relation to the whole object of the present inquiry, that the evidence on the matter be as perfect and unequivocal as possible; for, in fact, the practice proposed is based in the main, on the fundamental idea that the required compression and indentation of the infantile skull is *not* incompatible—as craniotomy is—with the continuance of infantile life.

Now, the records of midwifery contain numerous accurately observed cases in which the cranium of the child has become greatly compressed or flattened, or actually depressed and indented in one of its sides, while passing through a very contracted pelvis, and that, too, without necessarily destroying the life of the infant. Velpeau, for instance, the only author whom Dr. Radford quotes, tells us in a part of his work, which has evidently escaped Dr. Radford's observation, that the depression or "indentation (*enfoncement*) of the parietal or frontal bone, with or without fracture, has been noticed several times at the Maternity Hospital of Paris." * * * And "if," he observes, "the fracture or depression of the bones is not accompanied with effusion, nature ordinarily suffices to restore things to their primary state, and charges herself with the burden of the cure. Otherwise death is the usual consequence of them, or

[1] *Monthly Journal of Medical Science*, March 1847, p. 718.
[2] *Provincial Medical and Surgical Journal*, 1847, p. 405.

at least they produce drowsiness (*assoupissement*) and a great tendency to convulsions." [1]

Chaussier, who tells us that he had reported some examples of these depressions and indentations of the infantile skull in 1807 and 1810, makes the following judicious observations upon their general pathology and effects. "Sometimes," he observes, "when the sacro-vertebral angle projects too far forward, we find on the portion of bone which rested on this prominence an indentation or depression (*enfoncement ou dépression*), at which we often remark several small linear fissures (*fêlures*) in the form of a star, proceeding from the centre of the depression, and limited to the internal surface of the bone; at other times the bone is fractured in all its thickness, and its fragments are more or less separated, or forced in upon the brain; most commonly the infant dies in the act of delivery, or a short time after its birth." * * * * "These lesions, however, which would," he adds, "be always fatal for an adult, do not always terminate so badly in the new-born infant, for at this age the brain has neither the consistence, nor the action or use, which it ought to have subsequently; they even heal easily and spontaneously if the infant be vigorous, and the labour has not been too prolonged." [2]

Various practical authors have left incidental notices of such cases of depression observed in the skull of the infant at birth without the life of the child being compromised by the injury. Sometimes the injury has been the result of an excessive degree of compression by the forceps; but more usually it has been produced, as pointed out by Chaussier, by the head of the infant being strongly crushed against the projecting promontory of the sacrum, and that whether the infant passed as a cranial or footling presentation. Dr. Smellie, in his "Collection of Lingering Cases from a Small, Narrow, or Distorted Pelvis," prefaces his observations with this general remark, "that although these labours may seem to be of the same class, and require the same management with those that proceed from a large head, there is an essential difference; for though they are much the same with regard to the efforts of the woman, the operator in these has much less room when he is obliged to assist with his hand, and the child's head is disfigured and compressed

[1] *Traité des Accouchemens*, tom. ii. p. 588.

[2] *Recueil des Mémoires, etc., sur divers Objets de Médecine Légale*, Paris, 1824, p. 436.

into *large indentations*, occasioned by the jetting in of the upper part of the sacrum, and of the vertebræ of the loins."[1]

In the course of his valuable volumes Dr. Smellie in different parts casually details several instances bearing out this remark, and at the same time showing that the injury is not necessarily fatal to the infant. I shall abridge some of these cases.

Case XVIII.—In a woman,[2] "sickly from her infancy and very much distorted," Dr. Smellie effected the delivery of a living child by a double application of the forceps. "The forceps when first fixed had impressed the forehead, though the mark disappeared in five or six days after birth; but they made a very considerable impression when they were fixed a second time along the ears." The pelvis was "distorted from the jetting forwards of the upper part of the sacrum," and this projection had produced an *indentation*, distinct from those produced by the forceps; "the head was of a lengthened form, and contorted to one side, and there was a *deep impression* above the ear."—"Had the child been large, its life could not possibly have been saved."

Case XIX.[3]—The descent of the infant's "head was retarded by a jetting in at the middle of the sacrum," and the forceps were used. "The child's head was squeezed into a longitudinal form, flattened on the sides, with a *deep impression* on the cranium above the ears; and from an indentation on the os frontis by a blade of the forceps, which had been fixed on that and the occiput, I discovered the ears were not to the sides as I had imagined. These impressions," the author continues, "had very much galled and inflamed the parts, but in consequence of proper care they digested, and the child recovered, and as he grew up the marks diminished and disappeared.

Dr. Smellie describes a case of depression and injury of the infant's cranium at birth that is still more important than the preceding two in reference to the subject of the present inquiry, for in it the cranial indentation was produced in following the very practice which I am discussing, viz. in turning the infant when the brim of the pelvis was narrow and contracted. The following are the principal particulars:—

Case XX.[4]—A patient had a "narrow and distorted pelvis," in consequence of "the three lowest vertebræ of the loins bending forwards." The patient was delivered four times. At her first and third labours the infants were obliged to be extracted by the crotchet. Dr. Smellie tells us that he "managed her second labour from the beginning in a slow and cautious manner; but," adds he, "although the child was small, I with the greatest difficulty saved it by the assistance of the forceps." At her fourth accouchement the shoulder presented. Dr. Smellie tried ineffectually to perform cephalic version, and then with some effort seized one of the legs of the infant and turned it, and extracted it as far as the neck, the head still remaining above the contracted part of the pelvis. After

[1] *Collection of Cases and Observations in Midwifery*, vol. ii. p. 358. 2d Edit. London, 1758.

[2] *Ibid.* vol. ii. p. 458. [3] *Ibid.* vol. ii. p. 461. [4] *Ibid.* vol. iii. p. 230.

using considerable exertion in order to drag it through the deformed brim, Dr. Smellie states that he began to despair of the child's life, but adds, "as there was still a weak pulsation in the funis, I resolved to make another effort with all my strength, by which the head was moved a little lower; then forcing up my fingers to the forehead, I got a firm hold of it, and finished the delivery." The infant showed some weak signs of life, and in about ten or fifteen minutes began to cry. "The infant," adds Dr. Smellie, "continuing to cry incessantly while the head was washing, I examined and perceived a large tumour above the right ear; I likewise found a *depression of the temporal bone* before the ear, and the frontal and parietal bones pushed outwards; these formed the swelling, and were the parts that stopped at the distorted bones of the vertebræ." The child was quieted by applying pressure on the tumour with a compress and bandage. Next day the swelling had disappeared. The mother recovered better than in any of her preceding labours.

Dr. Smellie relates another case,[1] in which the head of the child was apparently injured in a similar manner in dragging it through "a distorted pelvis."

Case XXI.—The infant presented by the breech. After the body and extremities were born, "a good deal of force was used to deliver the head." Five minutes elapsed before the child breathed; at last it began to cry incessantly, "till one of the women observed a large swelling betwixt the left ear and temple." Pressure with the fingers first, and ultimately with a compress, quieted the child in the same manner as in the preceding case. "When I examined it," says Dr. Smellie, "next day, the swelling was gone, and it appeared to have been that part which stopped so long at the projection of the upper part of the sacrum before the head was delivered."

Dr. Denman has recorded one exceedingly interesting case, in which the head of the infant was much injured during the version and extraction of it through a deformed pelvis, and that, as in the preceding cases of Dr. Smellie, without compromising the infant's life. The case is altogether so pertinent to the subject of the present remarks, and affords so much important corroborative evidence, that I feel assured I shall be excused in giving the details in full, and in Dr. Denman's own words:—

Case XXII.—"Many years ago I attended a patient in two labours, in both of which there was a necessity of delivering with instruments, on account of the smallness and distortion of the pelvis, and neither of the children could be preserved. In her next pregnancy I made a proposal to bring on premature labour, to which she and her friends would not consent, and I was dismissed from my attendance. In the course of twelve or fourteen years she had five more children, not one of which was born living. In the forty-sixth year of her age she proved with child, and again applied to me. When her labour came on, the first stage was suffered to proceed without interruption, but when the membranes

[1] *Collection of Cases and Observations in Midwifery*, vol. iii. p. 95. Collect. 32, Case 11.

broke, I without delay passed my hand into the uterus, and easily brought down the feet and body of the child ; but the head being stopped by the narrowness of the superior aperture of the pelvis, I was obliged to exert and continue much force, before it could be extracted. The child was born with very little or no appearance of life, but by the strenuous use of the common means recommended for this purpose, it was recovered. On the left parietal bone there was a depression of considerable extent, and to my apprehension, of full one inch in depth, occasioned by the projection of the sacrum, but the depressed part gradually rose. In the course of a few months the bone regained its natural form, and the child was for several years in good health, with its faculties perfect. The woman recovered without any untoward circumstance."

"But," adds Dr. Denman, in a cautious and contradictory note, "the success of such attempts to preserve the life of a child is very precarious ; and the operation of turning a child, under the circumstances before stated, is rather to be considered among those things of which an experienced man may sometimes avail himself in critical situations, than as submitting to the ordinary rules of practice."[1]

In the second volume of her *Pratique des Accouchemens*, Madame Lachapelle relates the following instance of footling presentation in which the child was born with a depression of the parietal bone :—

Case XXIII.—A woman, pregnant for the second time, had a large accumulation of liquor amnii, and the child floated so easily in it, that when labour-pains first supervened, the presentation altered from time to time. The membranes at last were broken, and the left foot descended. By dragging at this foot, the lower extremities and then the trunk passed with facility. The left arm, however, got fixed between the head and pubis, and was disengaged with some trouble. "The head, however," to quote the author's own account, "although directed transversely, offered still greater difficulties in its extraction, either because the pelvis was a little distorted, or because our efforts were not absolutely directed according to the axis of the brim. At all events it is certain, that after the birth of the fœtus we found a *considerable depression* on the right parietal bone, which had rested upon the sacro-vertebral angle. In despite of this lesion, the infant, which was at first apparently still-born, not only lived, but the depression was dissipated, and indeed was scarcely visible fifteen days afterwards. The mother did not experience the slightest bad symptom."[2]

Dugès has recorded two cases which came under his observation, in which the cranium was very deeply depressed and indented in the way described in the preceding instances, and yet both children lived and did well.

Cases XXIV. and XXV.—In one of these cases of Dugès the frontal bone was so much *depressed*, that the left eye appeared as it were protruded from the orbit ; still the child neither suffered from convulsions, nor any other special symptoms.

[1] *Introduction to the Practice of Midwifery*, p. 382.

[2] *Pratique des Accouchemens*, vol. ii. p. 166.

In the second case the child had come footling through a pelvis, the great [conjugate?] diameter of which was estimated at three and a quarter inches. (*Dont le grand diamètre était évalué a trois pouces un quart.*) The head could not at first be extracted by the aid even of very strong tractions on the inferior jaw and shoulders, but scarcely were these artificial efforts momentarily suspended, when the head passed rapidly without assistance, and was expelled by the action of the abdominal muscles. The left parietal bone, which had pressed upon the promontory of the sacrum, was *depressed and indented* to the depth of half-an-inch, and throughout an extent of two inches. Two or three spoonfuls of blood were allowed to escape from the vessels of the cord, which yet beat with sufficient force, although the infant was apparently dead; and betimes the child became gradually reanimated, and began to cry, and passed meconium. It was troubled with constant hiccup, puckering of the lips, and torsion of the mouth to the left side; spasmodic closure of the right eye, immobility of the left; rigidity of the hands; fingers extended and separate, with the exception of the thumbs and the last phalanx of one of the index fingers, which were flexed inwards; rigidity of the arms and limbs. These symptoms were remittent, and returned in fits at intervals of ten minutes. Two leeches were applied to the left temple. The fits continued during the evening and night, but gradually became less and less severe. On the morrow the infant drank; it took the breast the following day; and in fifteen days after birth the cranial depression had almost entirely disappeared.

In his *Manual of Midwifery*, the same writer (Dugès) observes—"The bones of the cranium are often fractured with indentation, by the sacro-vertebral angle of the mother. It is one of the frontal, or one of the temporal regions, which is the most common seat of these lesions. * * * These fractures often heal spontaneously; the indentations even rise in a few days."[1]

Jacquemier, one of the latest French writers on midwifery, and from whose work I have quoted Dugès' cases, states that these fractures of the fœtal cranium, with depression, are not by themselves a cause of certain death; "the depression," he remarks, "relieves itself by degrees, and after ten or fifteen days there scarcely remain any vestiges of it."[2]

If it were required, I might cite other cases and remarks of the same description from other authors in evidence of the fact, that the state of compression and indentation of the bones of the infant's cranium at birth is not necessarily fatal to the infant's life. Some additional proofs will be quoted in the sequel; in the meantime I have, I believe, stated enough to show—*first*, that the neck of the child, if it be living, or only lately dead, is so strong, as to allow us to exert such a degree of traction upon the obstructed head, that the sides of the cranium may become greatly compressed, or even indented, under it; and, *secondly*, that Dr. Radford is truly wrong in

[1] *Manuel d'Obstétrique*, pp. 358, 359.
[2] *Manuel des Accouchemens*, tom. ii. p. 773.

stating that such a lesion and practice is incompatible with the safety of the child. On the contrary, the recorded experience of Velpeau, Chaussier, Smellie, Denman, Lachapelle, Dugès, Jacquemier, etc. etc., proves (as we have seen) that the depression and indentation of the child's head do not necessarily destroy the child's life. Nay, Dr. Radford's own experience on this point is, I know, not in favour of his own views, but of mine. In evidence of this I shall quote a case in point, recorded by Dr. Radford himself, from his own practice.

Case XXVI.—"I was requested," says Dr. Radford, "by Mr. Dick, to visit a poor woman in New Blakely Street, who was suffering from protracted labour, caused by contraction of the brim of the pelvis. The long forceps were applied, and the child delivered alive. *A depression of considerable size was produced on the left parietal bone*, from the pressure it had sustained from the promontory of the sacrum. The signs which the child manifested were those of apoplexy. The funis was divided, but no blood followed, as the pulsation had previously ceased. The child continued in the same state during the day, and in the evening was attacked with convulsions, which were frequent. Two leeches were applied to the temples, the bowels were opened, and the child recovered."[1]

But further, argues Dr. Radford, such a procedure as I propose is "at variance with all *scientific* views." I shall not stop at present to debate here whether the practice I suggest be "scientific" or not; but in a medical point of view I hold that appellation to be truly merited by any propositions and measures that tend, like the present, to promote the great essence and object of all medical science—namely, the preservation of human life; and in the various cases which I have quoted in the preceding sections, while none of the mothers were lost, the lives of the infants were at the same time all saved. But assuredly the heads of most of these children would have been opened by the perforator, and their lives thus destroyed, provided, in each instance, the structure of the cranium had not yielded, and its bony parietes become fortunately depressed and indented, to the degree required to admit of its safe transit through the contracted aperture of the pelvis.

Sect. VII.—Physiological and Pathological Reasons for the Life of the Child not being necessarily compromised under the Proposed Practice.[2]

It has been alleged that the preservation of the life of the infant is not compatible with its forcible extraction by turning through a

[1] *Essays on Various Subjects connected with Midwifery*, p. 11.

[2] See *Provincial Medical and Surgical Journal*, April 5, 1848, p. 172; and July 26, 1848, p. 393.

contracted pelvic brim. It must perish, it has been urged, in consequence of the lesions it necessarily sustains, and especially—1st, in consequence of the injurious compression to which its head is subjected during the forced delivery; and, 2d, in consequence of the required injurious traction upon its neck. Let us examine, in detail, each of these alleged necessary causes of death to the child under the practice in question.

1.—Is the Compression to which the Infant's Head is subjected incompatible with its Safety and Life?

In the remarks which I offered under the last section, with regard to the question whether, in turning in contracted pelves, the degree of injury to which the child's head is subjected is or is not compatible with its future safety and life, I confined the observations which I made, and the illustrative cases I adduced, to that form of cranial lesion in which the sides of the fœtal skull are both compressed and indented. In some instances, however, even when the pelvis is much distorted, one of these states only, as the lateral compression alone, *without* the indentation of the cranium, is all that is required in order to reduce the head to the size necessary for its transit. On one occasion, through a pelvis, the conjugate diameter of the brim of which was less than three inches, from projection of the promontory of the sacrum and disease of the symphysis pubis, I extracted a full-grown infant by turning; the head passing through in a flattened and compressed form, but without any depression or indentation upon it. It is, I believe, unnecessary for me to prove, that when the extraction can be effected with this single lesion, the child is not necessarily sacrificed; because I have already proved, that even when the two lesions of compression and indentation co-exist, the presence of both forms of injury is not necessarily incompatible with the continuance of life. And sometimes, by compression alone, more especially if the skull is not very fully ossified, the fœtal head may certainly be very greatly reduced in size, without compromising life. Dr. Denman conjectures that, to quote his own expression, "it may be reduced one-third below its original size, without the destruction or even injury of the child from the compression."[1]

It would, however, be improper to leave this subject without attending to some anatomical and physiological circumstances, in

[1] *Introduction to the Practice of Midwifery*, 1816, p. 352.

the structure of the fœtal head, that enable it to bear this great degree of lateral compression which we have been considering, without the necessary destruction of life. Indeed, perhaps the very knowledge of these circumstances may impart to the mind greater faith in the correctness of the principles of the proposed practice.

We shall afterwards have occasion to see that by far the most frequent form of morbid contraction of the brim of the pelvis consists in the projection forwards of the promontory of the sacrum, and this is a kind of distortion especially adapted for the artificial delivery of the mother by turning, instead of craniotomy. Under this kidney-shaped pelvic brim, and other varieties of pelvic contraction, when the child is delivered by turning, the direction of the compression of the head is, as we have already found, lateral and transverse, or, in other words, in the line of its bi-temporal or bi-parietal diameters, these diameters being reduced and shortened by it.

Now, of all directions, the *lateral* is the one in which the child's head can endure the greatest degree of compression, with the least degree of danger. The power of diminution of the child's head under labour "is greatest," observes Dr. Ramsbotham, "in the lateral diameter, and," he continues, "a full-grown fœtal head may be lessened from side to side, without endangering the child's life, one seventh of its own extent, or from three inches and a half to three inches."[1] Dr. Ramsbotham states that this degree of compression of the head, namely, to one seventh, may be accomplished without the life of the child being endangered. We have just now seen that Dr. Denman imagines that the amount of compression may be carried much farther, namely, to one-third, without the life of the child being necessarily injured and destroyed. No author has pointed out more correctly than Dr. Radford, the fact that the child's head will bear, with comparative safety, a far higher amount of compression in its transverse or bi-parietal diameter, than in its longitudinal or occipito-frontal diameter. When the head is compressed in the first of these modes, or transversely, "the brain," he observes,[2] "bears this alteration in the figure of the cranium with comparatively little inconvenience, because the pressure it sustains is parallel with the fibres of some of those parts which lie between the two hemispheres, and with the falx, which in its natural state

[1] *Obstetric Medicine and Surgery*, p. 25.

[2] *Essays on Various Subjects connected with Midwifery*, p. 7, etc.

supports this organ. The pressure is also less injurious, because it is applied upon the sides of the vessels, but not in such a degree as considerably to influence their calibres." When, however, the direction of the pressure happens to be in the opposite or longitudinal axis of the head, the results are very different, and far more dangerous. Then "the alteration," Dr. Radford remarks, "which takes place in the head is as follows:—A considerable diminution in the length of the occipito-frontal diameter is produced, in consequence of approximation between the frontal and occipital bones; the fontanelles become nearly obliterated, and the sagittal suture is wider and more prominent. The brain is pushed into this space, which is insufficient for its accommodation; its organisation is injured, and the child, when born, is either dead or dies soon after birth. The pressure applied to the fore and hind part of the head has a tendency to change the relative situation of many parts of the brain. It forces one hemisphere from the other, which, if carried beyond a certain degree, will inevitably produce laceration of the coats of the veins which pass to the longitudinal sinus; and this danger is increased by the great congestion which exists. These serious effects," he again states—viz. apoplectic congestion, sanguineous effusion, and softening of the brain—"are produced by the brain being compressed in a direction contrary to the course of the fibres of some of those parts which lie between the hemispheres, and also to the current of blood along the longitudinal sinus." Dr. Radford adds, that injuries of this character are sometimes met with when the head has been compressed and dragged through the pelvis by the long forceps; and he gives two dissections of the fœtal encephalon to show these results, congestion, effusions of blood, etc., in two cases in which the delivery was accomplished by this instrument. The cause for instrumental delivery and the application of the long forceps is not specified in one of these cases; in the other they were used on account of distortion of the brim of the pelvis. And certainly, if we employ the long forceps to overcome this difficulty, and place them as Deleurye, Haighton, Davis, Ramsbotham, and other excellent operators have recommended, with one blade over the face or forehead and another over the occiput of the child, we, in our extractive efforts, must compress the fœtal head with the instrument so applied, in its longitudinal or anterior-posterior axis; and hence the actual direction of our pressure would endanger the child more than the actual degree of it. If, in the same case, and under the same obstruction, however, the child were extracted by

turning, the required reduction of its head, by being effected entirely by lateral compression, would be effected, as we have already seen, not only with much greater facility, but with much greater safety to the infant; and the chance of injury to the brain, and of congestion and sanguineous effusion upon it, would be greatly less.

But, though the danger of cerebral congestion and its effects is diminished in lateral as compared with longitudinal compression of the child's head, yet it is by no means abrogated and removed; and in those cases of lateral compression and indentation of the cranium, which, under either footling or head presentations, prove fatal, it is this *effusion* and its dangers, more than the mere *compression* of the proper structure of the brain, that seems to lead to this result. . At all events, the cases I have already cited, in the last section, show that the cerebral tissue may be compressed, or, at least, displaced, in a lateral direction by the grooved and depressed cranium, not only without destroying or endangering life, but without producing coma or convulsions, or any greater lesion of function than a mere temporary asphyxia, provided always there be no serous or sanguineous congestion and effusion accompanying and resulting from it. The escape of the infant under this form of injury in which we are thus interested, is favoured by other circumstances. When the fœtal skull and encephalon are decreased by pressure in one diameter, they become lengthened and increased in others. In the form, for instance, of lateral compression resulting from extraction through a distorted pelvis by turning, while the head is flattened and diminished in its transverse diameter, it is temporarily lengthened to a corresponding degree in its vertical and longitudinal diameters. The anatomical peculiarities of the fœtal skull, the existence of fontanelles and sutures between its component bones, and the consequent isolation and mobility of the individual bones themselves, freely admit of this; and so far under cranial depressions, no doubt, save the proper tissue of the brain from a deleterious and destructive amount of pressure in a way that, under the same form of injury, would be quite unavoidable with the cerebral contents of the solid adult cranium. Besides, the immunity of the infant at birth under such apparently severe injuries may partly be owing to another and a physiological cause. The embryo and fœtus possess a much lower physiological type of life than that which pertains to the adult; nor is the transition from the one to the other abruptly and entirely completed when the infant passes from its intra-uterine to its extra-

uterine existence. It is stated by Billard,[1] and I could quote no more accurate observer, that symptomatic fever seems incapable of being excited in the constitution of the infant, by injury or otherwise, till the time of teething; and in all probability lesions such as these to which the crania and encephala are subjected at birth in the class of cases we have been considering, are less dangerous and fatal in their effects, in consequence of the general law, that the power of resisting and repairing injuries is greater in proportion as the type of animal life is lower. It is true, besides, that individual infants, like individual adults, have a power of withstanding injuries much more than others, and in a way that it is impossible to account for on any known principles.

Speaking of the differences among children in relation to the danger they incur, from compression of the head during labour, Jacquemier remarks:—"One infant, of a feeble constitution, will resist a long compression by the parts of the mother, or by the energetic and reiterated action of the forceps; another, of a strong constitution, whose head has not been a very long time, or very strongly, compressed by the pelvis, or between the blades of the forceps, readily dies, or only has a few hours' existence."[2]

Lastly, let me observe that the kind and degree of ossification of the bones of the fœtal cranium at birth admit of their yielding and becoming depressed in a manner that, no doubt, contributes to the safety of the infant. The ossification is as yet, in general, so imperfect, that the flat individual bones, such as the parietal and frontal, are still sufficiently thin and flexible to allow of their being partially indented and altered in shape by strong pressure applied to one point of their surface. They are, at the same time, usually so elastic as easily to be made to regain their former shape. And this indentation and restoration may occur without any appreciable fracture. In the first case which I have related, the right parietal and frontal bones, when their external surface was carefully examined after the removal of the scalp, were found deeply depressed, but apparently not fractured. They afterwards fissured, however, at the site of the indentation when being dried and pre-

[1] "L'absence de toute réaction fébrile, lors même qu'il existe des lésions graves chez les nouveau-nés; la promptitude, au contraire, avec laquelle la fièvre s'allume par la moindre cause chez les enfants qui ont dépassé l'âge de la dentition, imprime aux maladies de ces deux époques un caractère différentiel de la plus grande importance."—*Maladies des Enfans*, Preface, p. 2.

[2] *Manuel des Accouchemens*, p. 770.

pared for preservation. However, if the indentation is extremely deep, or the bones unusually ossified, no doubt fracture will take place, but still probably without danger, if without internal or encephalic effusion.

We have found Velpeau, and the other authors we have quoted, generally stating that the compressed cranium, and especially depressed portions of it, usually become spontaneously replaced and restored in the course of a short time after birth. This is, however, not always the case; nor is its occurrence absolutely necessary for the viability of the child. In evidence of this I shall content myself by citing a single illustrative case.

Case XXVII.—In the course of the last winter, after lecturing on the subject of these indentations in the fœtal cranium, one of the students in my class afterwards showed me, on his own person, two deep impressions, one on each side of the cranium, which had been produced by the use of the forceps, and which had afterwards continued permanently depressed. He was 20 years old. On the right side of the head, a little above the ear, there were two pretty deep, curved fissures or indentations, from two to three inches long. On the left side there was a single shorter indentation above the commencement of the temporal ridge.

2.—Is the Traction to which the Infant's Neck is subjected incompatible with its Safety and Life?

The answer to this inquiry need not detain us long; in fact, the proper reply to it has already been virtually given, when considering whether the existing degree of cranial compression and indentation was necessarily fatal or not. For if, as we have found, children can survive after being turned and extracted through so narrow a pelvic brim, that the sides of their crania are sufficiently collapsed and depressed against the sides of the contracted maternal pelvis, to admit of the complete transit of the head, then it is evident that the neck is not fatally injured under the proposed traction; for in all these cases the degree of traction upon it was adequate to produce all the results wanted, without destroying the child. In these instances the extractive force necessary to drag the head through the contracted pelvis was applied to the neck, and the neck was found sufficient to bear it without compromising the life of the child; and I believe, as I have stated previously, that this will generally, if not always, be found to be the case, "provided the child be living, or only lately dead." It will be very different, however, if the child has been for some time dead, and decomposing;

the structures of the neck, certainly, will not then bear such traction as is required to extract a full-sized head through a distorted brim; nor is it of any practical importance that it should, for such cases are cases for craniotomy, the child being dead, and forming no element for consideration in the mode or kind of delivery that is followed.

But, independently of the above decisive and conclusive testimony, and even if it were wanting, it would be easy, I believe, to adduce such cases and observations from obstetric clinical reports and other works, as would, *a priori*, have rendered probable what these cases render certain, viz. that the degree of traction to which the child's neck is subjected under the proposed practice, is compatible with its safety and life. I shall, for the sake of brevity, confine my illustrations of this remark to a note or two of some cases recorded by Dr. Smellie, and some observations offered by the ever-cautious Dr. Denman. Dr. Smellie gives various cases in which he was evidently himself astonished, as other practitioners have often been, at the excessive degree of traction which the neck of the infant stood during delivery in natural or artificial pelvic presentations, without the life of the child being compromised by it. For example :—

Case XXVIII.—In a breech case, where the woman was long in labour with a large child, and was suffering from some hemorrhage, Dr. Smellie brought down one foot, extracted the body and extremities, but the progress of the delivery was "stopped at the head," and required much traction for its transit, Dr. Smellie being "obliged to increase the force at every attempt." "I pulled," he observes, "so long, and with so great force, before the head was delivered, that I was surprised to find the child alive."[1]

Case XXIX.—In the next instance which he reports, one of the breech presenting in a narrow and distorted pelvis, after the body of the child was born, Dr. Smellie brought down the right arm, and "helped down the forehead; but," he adds, "before I could deliver the head, I was obliged to bring down the other arm, and saved the child also, though a *good deal* of force was used to deliver the head."[2]

Case XXX.—A young woman, of "a small size," was in her first labour. The thighs of the child, which was large, presented. The labour was very slow and lingering. Dr. Smellie brought down the feet, and effected the extraction of the infant. "I delivered," he remarks, "the head, but not without a good deal of force. The child was alive, which I scarcely expected."[3]

Case XXXI.—The breech presented, and the pelvis was narrow, and the child was born living. In attempting to deliver the head, Dr. Smellie tells us—"I imagined it was impossible the child would be alive, as I found the neck was so overstretched," having met "with greater difficulty than any that I ever delivered in that manner."[4]

[1] Collection 32, Case 10. [2] *Ibid.* Case 11. [3] *Ibid.* Case 18. [4] *Ibid.* Case 13.

In his classical and highly practical introduction to midwifery, Dr. Denman has devoted a special section to the consideration of the practice to be followed, in order to extract the head through the brim, in cases in which preternatural presentations happen to be complicated with distortions of the pelvis. His observations are most valuable in regard to the necessity of combined perseverance and caution, but they are too long to quote in detail. He tells us that "it has been said that children have been sometimes born alive when the strongest efforts, and those continued for many hours, have been made, to extract the head in this position; but I have not been so fortunate as to meet with any such instances, a short space of time having generally been sufficient to frustrate my hopes, and convince me that the child was dead, though when the head has been detained a considerable time, a few cases have terminated more favourably than I could have expected, and I have been agreeably surprised with the discovery of some faint signs of life, which, by the assiduous and careful use of the common means, have been improved, and the life of the child at length perfectly recovered."

"When we have," he continues, "in vain exerted all the force which we think reasonable and proper, and which, in some cases, must be more than any circumstance would be thought to require, it will be expedient to rest, for the purpose of gaining all the advantage to be attained by the compression of the head. On this account the mother will actually suffer no more inconvenience than would have been produced if the head had originally presented and been locked in the pelvis. After waiting some time, we must renew our attempts to extract, and thus proceed, alternately resting and acting with efficacy and resolution, and if the hold we may have of the body or extremities of the child does not suit, a silk handkerchief or other band may be passed round its neck, and this will be found a very handy and convenient instrument."

"It must be a *very great* disproportion," adds Dr. Denman, "between the head of the child and the pelvis, which is able to withstand this method of proceeding, if we persevere in it with prudence and steadiness; because the integuments of the head will burst, or the bones be bent inwards in an extraordinary degree, or even broken." If it fail, "it then only remains that we should lessen the head of the child, and the operation may be as easily performed in this as in the natural presentation of the head." "But it will," he continues, "be scarcely believed, how seldom this operation is

necessary under these circumstances, if we have not been in a hurry, but have acted with prudence; nor have I ever known any ill consequences follow the compression which the soft parts undergo between the head of the child and the sides of the pelvis, if proper attention were afterwards paid to the state of the bladder and rectum."[1]

We have already found, that when the child is extracted by turning through a contracted pelvic brim, its life is not necessarily sacrificed, as has been alleged by some,—either, 1st, by the injurious compression to which its head is consequently subjected; or, 2d, by the degree of traction required to be made upon its neck.

One more special objection to the proposed operation of turning remains for our consideration, viz.—

3.—Is the Practice incompatible or not with the Safety and Life of the Child in consequence of the Compression of the Umbilical Cord?

In speaking of the propriety of delivery by turning in the class of cases for which I have proposed it, Dr. Radford states, as an objection to it, the danger of death to the infant from pressure upon the funis, and consequent obstruction of the umbilical circulation. In footling presentations, "the funis," he observes, "is subject to fatal compression;" and he imagines this danger must be greatly increased in cases in which the child has been turned on account of distortion of the maternal pelvis.

Perhaps the proper and the most direct answer to this, as to the other objections to turning, drawn from supposed dangers to the child, is simply a reference to the actual results of the cases which I have already quoted, and may yet have occasion to quote in the sequel. In many of these the child will be found to have passed or been drawn footling through a contracted pelvis, and yet, in despite of the alleged fatal danger of compression of the funis between the body or head of the child and the interior of the maternal passages, the infant *has* been born alive. The infant has been subjected to the alleged cause of danger and death without the alleged effects following; and hence we are surely entitled to conclude that the influence of the cause is not so likely to interfere with the operation of delivery as has been theoretically presupposed.

[1] *Introduction to the Practice of Midwifery*, pp. 497, 498, 499.

Let me not be misunderstood. I by no means wish to argue that in turning in distorted pelvis there is no danger to the child from umbilical compression, for I believe quite the reverse; but I imagine, at the same time, that on first thinking over this undoubted source of danger, we are apt in our own minds to magnify its effects. Experience, as I have just now stated, teaches us that they are not so great as theory might lead us *a priori* to believe; and when we consider the subject for a moment, we shall find, I think, sufficient reason for seeing—1st, that the risk and occurrence of umbilical compression in footling presentations and turning is not so very great as to invalidate the practice, and that it is in part averted by the very form of distortion to which the pelvic brim is most usually subject; besides, supposing, 2d, the compression to take place, there may still, I believe, be measures in the resources of science, by which, if we cannot now avert the occurrence of compression of the cord, we may prevent at least the more dangerous consequences of the complication for the child. I shall speak briefly of each of these points.

The Danger and Mortality from Compression of the Cord is not so great as to invalidate the Practice of Turning.—Dr. Churchill has published a table of 542 cases of turning in which the result to the child is mentioned. In these 542 cases, 182 children were lost, or rather less than 1 in 3. And when we recollect that, no doubt, in many of these 182 cases the child was dead *before* turning was adopted, and that in others the cause demanding the delivery, such as presentation of the placenta, was the cause also of the infant's death, etc., we shall see reason to believe that the chance of death to the child from the compression of the cord would be found to be less than the chance of death from the application, and compression, and traction of the long forceps; for, even in the more common form of delivery by the short forceps—an operation which is generally looked upon as less dangerous to the child than delivery by the long forceps—the mortality among the infants is as great or greater than by turning.

Out of 871 cases of delivery by the forceps, and almost always the short forceps, collected by Dr. Churchill, 175 children were lost, or 1 in every 5.

Out of twenty-four short forceps cases which occurred in the Dublin Hospital during Dr. Collins' mastership, eight of the children were still-born, or 1 in 3. Out of thirty-three cases of presentation of the shoulder or arm which he treated by turning, in two the

child was putrid, and in two others there was hemorrhage, in one, of the unavoidable, and in the other, of the accidental form, and death of the children. Among the twenty-eight remaining cases, nine were born dead, or nearly 1 in 3. Here, suppose we admit that the cause of death in these nine children was traceable to compression of the umbilical cord; still the infantile mortality was probably as little or indeed less than would be found to result from delivery with the long forceps.

Out of forty-two forceps cases related by Dr. Lee in his *Clinical Midwifery*, in thirty-one cases the child was still-born, or 3 out of every 4 of the infants were lost. In thirty-nine instances in which he had recourse to turning in transverse presentations, twenty-nine of the infants were born dead, or about 3 out of every 4. His deliveries by the forceps were fatal to the children in 3 out of every 4 cases; and his deliveries by turning were fatal to the children in nearly the same proportion of 3 out of every 4 cases.

Out of ninety-three forceps cases related by Madame Lachapelle in her *Pratique des Accouchemens*, in fifteen the children were still-born, or 1 in every 6 of the infants was lost. In sixty instances in which she had recourse to turning in transverse presentation, eleven of the infants were born dead, or 1 in every $5\frac{1}{2}$. Her deliveries by the forceps were fatal to the children in the proportion of 1 in 6; her deliveries by turning were fatal also in a similar proportion, namely, about 1 in $5\frac{1}{2}$. Of ninety-six forceps cases occurring in the practice of Madame Boivin,[1] in twenty the children were born dead, or 1 in every 5 of them was lost. In sixty-two cases in which she resorted to turning in transverse presentations, seven of the infants were still-born, or about 1 in 9 was lost.

To obtain with more certainty the general comparative average mortality of forceps cases and cases of turning in transverse presentation, let us combine the data above given from the practice of Collins, Lee, Lachapelle, and Boivin.

The following table exhibits in an abridged and simplified form, the results of this collection of cases:—

[1] *Mémorial de l'Art des Accouchemens*, Table, p. 464.

TABLE VII.

Comparative Mortality of Children in Cases of Delivery by the Forceps, and by Turning in Transverse Presentation, in the Practice of Collins, Lee, Lachapelle, and Boivin.

Mode of Delivery.	No. of Cases.	No. of children still-born.	Proportion of Still-born Children.
Forceps cases . . .	255	74	1 in every 3 died.
Turning in transverse presentation . .	194	58	1 in every 3½ died.

Arrangements and Means by which Compression of the Cord, and its Effects, may be averted.—Dr. Radford believes that when the child is extracted by turning on account of distortion of the maternal pelvis, the danger of fatal compression of the umbilical cord is then greatly increased by the fact of the distortion. But the common variety of contracted pelvis requiring turning is (as I have already stated, and shall insist more upon afterwards), the peculiar and common kidney-shaped distortion of the pelvic brim, which is produced by the anterior prominence and projection of the sacral promontory. When the fœtal head enters it, as it does under extraction by turning, with its long, or occipito-frontal diameter lying in the transverse diameter of the brim, then we have (see Fig. 14, p. 406) a free space left, of greater or less size, between the face or forehead of the child, and the ilium to which it looks. In this space sufficient room may certainly, in general, be found for the free lodgment of the cord without injurious compression. The very narrowness of the conjugate diameter of the brim prevents this space from being entirely filled up and encroached upon, by preventing the great mass and breadth of the head, from the coronal suture backwards, from further passing over to this partially occupied side of the pelvis. Besides, this uncompressed lateral space is the very site along or near which the cord necessarily passes in descending from the uterus, and stretching between the placenta and umbilicus. For the anterior surface of the abdomen of the child, to which the lower end of the cord is attached, always, of course, looks to that side of the pelvis to which the face is directed; and it is on that side that we have the free and uncompressed space I speak of, as fitted for the safe transit and lodgment of the cord. In thus stating the space as free and uncompressed, I mean in so far as the adjoining opposite surfaces of the child's head and interior of the pelvis are concerned. The space itself may be

filled up, or the cord in it pressed upon by the circle of the cervix uteri or other soft parts, but, certainly, a little adjustment and management may often prevent any fatal compression from these sources; for the cord may be carried round by the accoucheur to that point in which there appears the greatest space, and consequently the greatest freedom from compression; and he may sometimes defend it from the pressure of the cervix by allowing it to pass between two fingers, introduced either for the sole purpose of protecting it, or with the view of simultaneously assisting the extraction of the head by applying some force to the cheeks or lower jaw. In both natural and artificial footling presentations it has even been proposed to defend the cord more methodically, by shielding and enveloping it at the part liable to compression in a kind of special protecting instrument. Dr. Joos of Schaffhausen has ingeniously proposed an instrument for this purpose.[1] It consists of a tube, from four to eight inches in length, and of calibre sufficient to contain the umbilical cord, leaving a longitudinal slit or fissure equal to $\frac{1}{12}$th of its circumference. It is composed of caoutchouc or leather, in which are embedded a series of steel rings three lines broad, and at the distance of one line from each other. The slit is opened up at one end by the finger, so as to admit the umbilical cord, and in the same manner it is made to receive it along its whole length, the fissure closing up as the finger is removed. A handle may be required subsequently, to keep the instrument in its proper place. "The application of the instrument," says Dr. Joos, "takes place during the act of birth, by presentation of the breech or feet, in cases where delivery is effected by version and bringing down the feet, and in cases where the cord is prolapsed and cannot be returned." But I greatly doubt whether, even if we were provided with such an instrument as Dr. Joos describes, we should not find the difficulties of applying it, and the time required for that purpose, more dangerous to the infant than the extraction of the child's head by more simple and direct means. It is always well to avoid instruments when we can avoid them; and such a one as the present might not be used without some danger to the structures of the os uteri.

Suppose, however, that the means we used to avoid compression of the cord, by placing it in the least occupied point at the brim, or by preventing the soft parts from pressing upon it, by the fingers, or otherwise, were in vain, and that at last it really became irre-

[1] *Medical Gazette*, Oct. 22, 1847.

trievably compressed, and its pulsations arrested before the head could possibly be extracted, is the safety of the child utterly hopeless? I believe not. Long ago, Pugh and Morlanne recommended a practice that has been latterly followed by Bigelow and others, and which, I believe, is calculated in some instances to enable us to continue the life of the child, by continuing its respiratory function, whilst we go on exerting, from time to time, those cautious yet decided means, which we have seen Dr. Denman recommending, for effecting the complete extraction of the obstructed head. The means to which I allude consist in exciting pulmonary respiration in the half-born child, now that its placental respiration is stopped, and in making it continue that vital process by the action of the lungs, now that it is prevented from being exercised by the medium of the placenta and umbilical cord. "When the parts are well made," says Pugh,[1] "and the child in proportion, happy the case! It will come then any way; the arm being brought down, the head only remains to be extracted, which must be done with as much expedition as possible, as indeed the arms ought to be; for, consider, when the child has passed the navel, the circulation between it and the mother is stopped from the pressure of the umbilical rope; you must then introduce the fingers of your left hand into the vagina, under the child's breast, and put the first and second fingers into the child's mouth pretty far; so far, however, that you are able to press down the child's tongue in such a manner, that by keeping your hand hollow, and pressing it upon the mother's rectum the air may have access to the larynx; you will soon perceive the thorax expand, as the air gets into the lungs. *By this method*," he adds, "*of giving the child air, I have saved great numbers of children's lives, which otherwise must have died.*"

Acting on the plan thus suggested by Pugh, we may in some cases be able, with a little management, to change thus the respiration of the infant from its intra-uterine to its extra-uterine type, though the head be still held and arrested at the brim; for the mouth of the infant is always then within reach, and could, I believe, be used for the purpose of admitting a proper quantity of air into the pulmonary passages, even when the great bulk of the head is still held above the brim. It is a practice, at all events, which sometimes succeeds sufficiently well when the head is down in the pelvis, and we have all the difficulties of a rigid outlet and perineum

[1] *Treatise on Midwifery*, 1754, p. 49.

to contend against, in our attempts either to extract the head, or to admit a sufficiently free access of air to the mouth of the fœtus. The two following cases, which I extract from Dr. Lee's *Clinical Midwifery*, will illustrate and impress the practice and the remarks upon it, which I have just made :—

Case XXXII.—The nates presenting, the trunk and extremities were extracted, "but the head could not be drawn through the external parts, from the rigid state of the perineum, and the pulsations of the cord were becoming more and more feeble. So great was the resistance of the perineum, that it was impossible to overcome it without destroying the child. I pressed back its edge, however, so far, that the external air could enter the mouth of the child, and it respired in this way fully twenty minutes after the pulsations of the cord had ceased. In spite of all our care, the edge of the perineum gave way as the bulky part of the head passed through the external parts, but the child sustained no injury, and continued to live."[1]

Case XXXIII.—"I attended a lady in her first labour, on the 22d of October 1837. The nates presented, and the cord ceased to pulsate after the trunk and extremities of the child had been extracted. The perineum was so rigid, that the head could not have been delivered without using so much force, that the parts must have been torn, and the neck of the child injured. I held the body of the child as far forward as possible, while Dr. H. Davies assisted me in holding back the perineum, that the air might enter the mouth of the child. The respiration went on for nearly half-an-hour before the head could be safely drawn into the world, and during the whole of the time there was no pulsation in the cord. The child is alive, and the perineum was not injured."[2]

The child may not only be able to breathe, but even heard to cry, with the head still unborn, when this form of treatment is adopted. In his paper on the subject, published in the *American Journal of Medical Sciences* for 1829, Professor Bigelow (of Boston) states, amongst others, the following case :—

Case XXXIV.—In a case of arm-presentation, in which the feet were brought down, and the body delivered, "the face turned towards the perineum, the mouth was easily reached, and the fingers were opened to give passage to the air as before described. No struggle nor attempt at respiration, however, occurred. A handful of cold water was then dashed upon the body, upon which the child immediately gave a spring, and began to cry. The head was not delivered till some minutes afterwards."[3]

In his observations and directions upon this modification of practice, Dr. Bigelow observes :—"After the body is expelled, if the head can be seasonably delivered, either by the recurrence of

[1] *Clinical Midwifery*, Case 239, p. 129. [2] *Ibid.* Case 241, p. 131.
[3] *American Journal of Medical Science*, Aug. 1829, p. 288, Case 3.

pains, or by the successful efforts of the practitioner, no difficulty ordinarily occurs. But this desirable state of things cannot always be realised; too frequently the size of the head, and the resistance of the pelvis or soft parts, renders the delivery difficult or hazardous, and the practitioner, in the midst of his efforts, is apprised by a convulsive jerk, or spring of the body, that a state of extreme danger exists, and that the time has come at which the child must breathe, or will speedily die. If at this period the fingers be introduced, so as to reach the mouth of the child, it will be perceived that each jerk of the body is attended with a gasp, and convulsive effort at inspiration, performed by the mouth and chest of the child. In this state of things, if air be conveyed to the mouth of the child, it will immediately breathe, and the efforts of nature, as will hereafter be shown, may, in most cases, be safely waited for to assist in expelling the head."[1]

"The method to be pursued," he continues, "in conveying air to the mouth, depends upon the situation of the head. If the chin has descended low in the pelvis, so that the mouth rests upon the perineum, or lower part of the sacrum, and can be readily reached by the fingers, the hand of the operator alone is sufficient to give the assistance required. But if the mouth is situated so high in the pelvis as to be reached with difficulty, or if, from the large relative size of the head, there is much compression, the assistance of a tube may be of use. The mode of proceeding which I have found successful in various instances is as follows:—As soon as the body and arms are extracted, supposing the face towards the sacrum, an assistant supports the body, carrying it towards the pubis; or the reverse, should the position of the face be to the pubis. The accoucheur should then introduce the hand to which the face looks, till the middle fingers rest upon the mouth of the child; the hand is then to be raised from the throat of the child, making the ends of the fingers a fulcrum, and pushing the perineum backwards; the air will thus pass upwards as far as the chin of the child; the middle fingers are now to be separated about half-an-inch from each other, and thus a complete passage will be formed between them, by which the air will reach the mouth of the child. If the child be in a healthy state up to this period, it will immediately breathe and cry, and the delivery of the head may be safely postponed till the natural pains recur. If, from any degree of asphyxia, the child does

[1] *American Journal of Medical Science*, Aug. 1829, p. 285.

not immediately breathe, it may often be made to do so by dashing cold water upon the body, or by other stimulating processes. It has even appeared to me practicable to inflate the lungs, in some cases, through an elastic catheter. When the mouth is so high in the pelvis as to be reached with difficulty, or when the compression is so great as to obliterate the cavity between the fingers, a flat tube will be found useful, made of metal, of spiral wire covered with leather, or of elastic gum, and having its largest diameter about half-an-inch. If the tube be of metal, or of any incompressible material, it should be withdrawn during a pain, to prevent contusion of the soft parts, and immediately replaced if the pain subsides without expelling the head. Such a tube may be considered as a prolongation of the trachea, and is fully sufficient to sustain life by respiration for a considerable time. The tube must be guarded and directed by keeping it between the fingers of the inserted hand."

In addition to the above remarks on the possible means of preventing fatal compression of the umbilical cord, there is one observation more which I am anxious to make. If all the preceding measures fail to avert compression, there is always still one strong hope left—namely, that if after complete compression of the umbilical vessels has occurred, no very great length of time is lost in the extraction of the head, the child may yet be born alive. For the type of vitality in the unborn infant is such that it will often survive, and be capable of being resuscitated, although the placental respiration be arrested for several minutes before its actual birth. And with others, I have been repeatedly surprised, in such cases as we are considering, both at the great amount of extractive force which the structures of the infant will sometimes undergo without life being destroyed, and at the apparently great length of time during which, in making these extractive exertions, the infant will still survive, and that too, although the cord was compressed during their continuance. If the infant be perfectly viable, and its heart sounding normally at the time that turning is adopted, there are perhaps comparatively few cases in which it will be requisite to expend so much time upon the forcible compression and extraction of the head, as to destroy during that time the child's life by simple compression of the cord alone. The following case, which occurred within the last few days, may perhaps impress this remark. In it the fœtal heart continued to beat regularly, not only after the cord was compressed for a considerable time, during which very strong

exertions were made in order to extract a large and very firm head through a pelvis three inches in its antero-posterior diameter, but its pulsations went on for several minutes, even after the head was perforated, an operation that required some time for its performance, and after the cervical spine had yielded under the traction applied.

Case XXXV.—With Drs. Ziegler and Weir, I delivered at the Maternity Hospital, on April 17th, a woman, aged 19, in labour with her first child. The os uteri was fully dilated, and the child's head had remained at the brim during nearly ten hours of active labour-pains. The parietal bones were riding over each other at the sagittal suture, and the right parietal bone was somewhat indented by the sacrum, upon which it rested. The conjugate diameter measured about three inches. A very deep dose of chloroform was given. Turning was effected, and the body of the child delivered. Strong traction was applied in vain to bring the head through the contracted brim, and at last the bones of the neck threatened to give way. The cranium was then perforated behind the ear, and by the aid of a crotchet in the mouth the delivery was completed. The child did not breathe, but the pulsations of its heart went on regularly for several minutes after delivery. The child weighed upwards of seven pounds. It measured twenty-one inches in length. Its head was large and firmly ossified.

CONCLUDING REMARKS REGARDING THE OBJECTIONS TO THE PROPOSED PRACTICE FOUNDED ON THE ALLEGED DANGER AND DEATH OF THE CHILD.

In terminating the present section of our subject, I would again repeat, in regard to the whole, the argument which I have used against the alleged fatality of the individual sources of danger that we have inquired into. It has been averred that under the proposed practice of turning in distorted and contracted pelves, the injury which the fœtal head must sustain would be fatal to the child—the injury of the neck would be fatal to it—the injury of the cord would be fatal to it. I have shown the principal fallacies to which these arguments are individually liable. Against the truth of the whole, in a combined form, I would here again simply and strongly appeal to the evidence of facts and experience. For the results of the cases of the practice that I have given, and of others that I may yet have occasion to give, amply attest that in various instances in which it has been adopted, the indentation and depression of the skull of the infant were not fatal to it, nor was the traction of the neck fatal to it, nor the pressure upon its funis. It was submitted to one and all of these sources of supposed danger and death, and yet escaped alive from all. And having done so when

the principles and details of the practice were not at all understood may we not expect still happier and more successful results when these principles and details come to be better comprehended, and more systematically acted upon?

I have heard turning objected to by some, in arrestment of the head at the brim, on the ground of its inevitably occasional, or rather frequent, fatality to the child. But when we have any new operation proposed, with the view of replacing other operations, such as turning in distorted pelvis, instead of delivery by the long forceps or craniotomy, we can only properly judge of the real and relative value of the new operation, not by looking at its own absolute and isolated results, but by looking at its results as compared with the results of those other operative measures for which it is suggested as an alternative. Now, as regards the respective value of turning, to the infant, in comparison with the two operations for which I propose it as a substitute, the case is, of course, very different, according as we contrast it, *first*, with the long forceps; or, *secondly*, with craniotomy.

We have seen that the fatality to the child from the common operation of turning in transverse and cephalic presentations, was, in the Dublin and Parisian hospitals, nearly the same as the common operation with the short forceps, or indeed was in favour of turning, there having been in neither set of cases any very special state of pelvic contraction; and perhaps, if we had any adequate data, we should find that the same analogy in their results held good when they were respectively applied under greater and increased degrees of difficulty, as in morbid contractions of the pelvic brim; always, however, with this important difference in favour of turning—that it could be employed at a much earlier, and, consequently, as respects both the mother and child, at a much safer period of the labour than was fitted for the adoption of delivery by the long forceps; and always also recollecting that the comparison of the results of turning, with the results of short forceps operations, is imperfect in this respect, that from the direction of the compression in long forceps operations—viz. in the antero-posterior or oblique diameter of the fœtal head—the danger and mortality to the child is generally far greater than when the short instruments merely are used, the direction of the compression with them being transverse.

But delivery by the long forceps, under any conditions, is an operation entirely rejected by many eminent accoucheurs, and very

seldom indeed adopted in country practice. And I have already often stated, but cannot, perhaps, too often repeat, that it is principally as a substitute and alternative for craniotomy in contracted states of the pelvic brim, that I bring forward the operation of turning. Now, as far as regards the child, the results of these two modes of delivery, craniotomy and turning, in this special and not unfrequent set of cases, are easy of comparison and settlement. For the very essence of the one operation, craniotomy, is the actual death and instrumental destruction and mutilation of the child. The object of the other operation, turning, is to offer the child, under the very same circumstances, a chance of escape and of life. Craniotomy implies the inevitable sacrifice of the infant. Turning implies its possible safety and probable survival. And the distinction between them which has latterly been always uppermost in my own mind, is this—delivery by craniotomy consists in opening and breaking down the skull so as thus to reduce it to such dimensions as will allow it to pass through the contracted pelvic brim; but the operation which I propose to substitute for it, and by which the requisite diminution of the fœtal head may likewise be produced, consists, not in fatal opening and emptying of the skull, but in compressing, and, if necessary, depressing its flexible and elastic parietes; and further, I have shown that extraction by turning affords us the means of effecting this compression and indentation without always compromising the life of the infant. As far then as regards the safety and life of the infant, I hold that any general comparison between craniotomy and turning is altogether and entirely in favour of the new practice. But how stands the comparison between the effects of the two operations in relation to the safety and life of the mother? To answer this question a separate section is required.

Sect. VIII.—Supposed Objections to the Practice in Relation to the Life of the Mother.[1]

In the last section, when treating of the effect upon the infant of the practice which I propose in distortions of the pelvis, I took occasion to state, that the only proper test or measure of value between a novel operative measure like this, and those operative measures for which it is suggested as a substitute, consists in ascer-

[1] See *Provincial Medical and Surgical Journal*, October 4, 1848, p. 533.

taining, not the absolute mortality attendant upon the new operation alone, but the comparative mortality attendant upon the new as compared with the other and older forms of treatment. In the same way, in the present section, the question is not—What is the absolute maternal mortality attendant upon delivery by turning in cases of contracted pelvis? But, What is the mortality attendant upon that operation, as compared with the mortality accompanying the alternative operations of delivery by the long forceps and by craniotomy?

In the records of midwifery, there do not yet exist, so far as I am aware, any data by which it is possible to compute either the general or relative mortality to the mother, from the use of the long forceps? Nor can we obtain any satisfactory approximation to the probable results of their employment upon the mother, by studying the maternal mortality attendant upon the use of the short forceps. For the short forceps are employed only in cases in which the head is already sunk down into the pelvic cavity, and when the application of the instrument is far less difficult, and its effects less dangerous, than when the long forceps are had recourse to in consequence of the child's head being arrested high up in the passages, from the obstruction of a distorted pelvic brim.

It is principally, however, as an alternative for craniotomy that we have to consider the propriety of turning; and there exist numerous data by which we may compare the relative mortality of these two operations. On this and other points in the statistics of midwifery, the laborious and valuable investigations of Dr. Churchill have thrown much light. The following table, which I have drawn up from Dr. Churchill's collection of data, shows us the general relative mortality attendant upon craniotomy and turning, in so far as regards the life of the mother.

TABLE VIII.

Showing the Results to the Mother in Craniotomy and Turning.

Operation.	Number of Cases collected.	Number of Mothers lost.	Proportion of Mothers lost.
Craniotomy .	251	52	1 in 5
Turning . .	169	11	1 in 15

In some of these cases of turning, the deaths may, as Dr.

Churchill points out, have been owing to the cause which demanded the operation, such as placenta prævia, and not owing to the operation itself; but I believe with him that the resulting calculations are "not very far from the truth."[1]

So far, such an imperfect estimate of the mere mortality of the two operations gives a result highly in favour of turning. But there is another element which comes into action, and which is not included in the above comparison. Most of the turning cases were instances in which the operation was performed in consequence of the child presenting transversely, and with most of them comparatively little or no difficulty was probably encountered in getting the head to pass the pelvic brim. In the class of cases in which it is my object to recommend turning—viz. with the brim narrow and distorted—would the operation, from its requiring the forcible extraction and compression of the head, be attended with much increase of peril to the mother?

On such a question being first suggested, most accoucheurs, I believe, would be inclined, *a priori*, to argue that the compression, however transitory, of the soft tissues included in the maternal pelvis, between the interior of the maternal pelvic bones and the solid though elastic head of the infant, would be sure to be attended with inevitable danger and evil consequences to the maternal structures; that the practice would, in short, be, as Dr. Radford has expressed it, "incompatible with the safety of the mother."

Prejudgments, however, even in pathological and practical matters of this description, are often wrong. Let us lay aside argument for experience, and supposition for fact, and examine, quietly and without prejudice, the actual and probable results of forced operative extraction of the infant's head in cases of obstruction of the pelvic brim.

Dr. Denman had evidently some experience of the forcible extraction of the infant's head through contracted pelves, in preternatural presentations of the child. The rules of treatment, which I have already quoted from his chapter "On the Complication of Breech Cases with Distortion of the Pelvis," show how entirely, or almost entirely, he trusted in these instances to the forced extraction of the head, and how very rarely, if ever, he had occasion to assist the delivery by craniotomy. And he states the results of all his observations in these instances, in terms most significant of its

[1] *Principles of the Practice of Midwifery*, p. 245.

safety. "Nor have I *ever* known," says he, "any ill consequences follow the compression, which the soft parts of the mother undergo, between the head of the child and the sides of the pelvis, if proper attention were paid to the state of the bladder and rectum."[1]

The cases I have cited from Dr. Denman, and the others adduced in the preceding sections, so far afford corroborative evidence of this important remark. Altogether, I have already referred to twelve or thirteen cases, in which the force of extraction or expulsion was so great, that the head was not only compressed but indented. In none of these does the mother seem to have suffered from the compression or contusion. But these cases, it may be argued, are too few to entitle us to speak over positively on the point. Let us turn, then, to others.

It often enough happens, among cases of pelvic distortion, that when the head of the child presents, and becomes obstructed at the brim, the mere perforation of the head, or first part of the operation of craniotomy, is not adequate to allow the operator to overcome, with subsequent ease, all the resistance of the obstacle opposing delivery. In many cases, the second or succeeding part of the operation of craniotomy—viz. the extraction of the head with the crotchet through the contracted and obstructing brim—is still attended with difficulty, and requires for its completion more or less prolonged exertion by pulling and force. Under such circumstances, and though the child presents by the head and not by the feet, we have exactly the same form of danger threatening the soft structures of the maternal pelvis, as if the excessive traction were made, not in craniotomy, but in turning. The two cases agree in this one common condition, that in both, an exertion of traction and force is required to pull the obstructed head through the contracted pelvic brim ; and in both, the soft tissues lining the pelvis of the mother are equally liable to be contused and compressed, under this traction and force.

Now, in cases of craniotomy, such as I here allude to, and which require the operator to use *great exertions* in dragging the head with the crotchet through the obstructing brim, is the mortality to the mother much increased above what it is in the common run of craniotomy cases? Or, to state the question in other terms, are such cases of craniotomy decidedly more dangerous and fatal than

[1] *Practice of Midwifery*, 1816, p. 469.

other cases of the same operation, in which such excess of traction is not required?

Dr. Lee's *Clinical Midwifery* presents us with a series of data relative to craniotomy operations, that may enable us to arrive at some accuracy of information regarding this question. In the first and second Reports of his work, Dr. Lee details eighty-seven cases of craniotomy. Table IX. gives a condensed view of the principal facts and results connected with these eighty-seven cases.

TABLE

Analysis of 87 Cases of Craniotomy, recorded by Dr. Lee,

No. of Case.	No. in Report.	Cause of Obstruction and Delay.	No. of Pregnancy.	Length of Labour before Operation.
1	1	Rigid os uteri ; vagina swollen and tender	1	Three days and nights
2	2	Head never through brim—convulsions	1	Fifty hours
3	4	Head jammed in brim	...	Above 48 hours
4	5	Head not passed brim. Os uteri half dilated	2	Two days (48 hours)
5	8	Head not passed brim	1	Nearly 60 hours
6	8	Scalp tumid ; bones riding	2	Strong, above 30 hours
7	8	Head wedged in brim	3	... ...
8	9	Impacted in brim	...	... ...
9	16	Not through brim. Os uteri rigid, not fully dilated	1	About 50 hours
10	17	Head low but not through the pelvis ; anterior lip of uterus locked ; labia swollen.	1	About 48 hours
11	25	Head and arm jammed in brim	2	Above 30 hours
12	29	The greater part of the head had passed through the brim	...	Forty-six hours
13	30	Great part of the head still above brim	1	Above 20 hours
14	31	Head not completely in the cavity of pelvis	...	... ...
15	32	Head so low that the ear could be felt	1	Above 72 hours
16	34	Head sufficiently low for the forceps	1	So long that she was quite exhausted
17	35	Head filled the cavity of the pelvis	1	Above 41 hours
18	38	Cavity of the pelvis occupied by a tumour the size of a cricket-ball, or larger.	...	Twenty-four hours
19	39	Os uteri not fully dilated, thick and rigid, and pressed down with the head through the brim of the pelvis.	1	Above 50 hours
20	40	Head firmly impacted in brim of the pelvis	1	Above 30 hours
21	41	Distortion of pelvis, and hard cicatrix of vagina	...	... ...
22	42	Head jammed in the brim	1	Long in labour
23	43	Head within reach of forceps	1	... ...
24	56	Pelvis distorted	1	Sixty-seven hours
25	57	Face presentation	...	Above 48 hours
26	58	Head and arm	1	Seventy-two hours
27	59	Head long fixed in the brim	3	Forty hours
28	60	Head many hours impacted in the brim ; vagina swollen and tender.	1	Thirty-six hours

IX.

IN THE FIRST AND SECOND REPORTS OF HIS "CLINICAL MIDWIFERY."

Difficulty or not in Extraction.	Death or Recovery of Mother.	Other Results. Inflammation, Sloughing, etc.	Remarks.
Not stated . .	Recovery	Sloughing; fistula	Long forceps tried first.
Not stated . .	Recovery	Violent inflammation of uterus	Long forceps tried first.
Required 1½ hr., bones of head, etc., much torn	Recovery	Post-partum hemorrhage	Tried first to apply forceps.
Great difficulty .	Recovery	Slight uterine inflammation	Tried first to apply forceps; craniotomy in former labour.
Long-contd. efforts	Recovery	... ...	Recovered rapidly.
Little difficulty .	Recovery		
Not stated . .	Death	... ...	Ergot and repeated efforts with forceps tried previously.
Strong efforts .	Death	... ...	Forceps tried first; vagina enormously swollen.
Force required .	Recovery	... ...	Not able to apply the forceps. No bad consequences followed.
Not, except in overcoming perineum . .	Recovery	Inflammation and sloughing of vagina and cicatrix.	
... ...	Recovery	... ...	Delivered of first child by forceps.
With difficulty .	Recovery	No bad effect . . .	Forceps tried first.
Not stated . .	Recovery	Perineum torn by shoulders of infant	Forceps tried first; delivered since without asssistance.
Great force . .	Recovery	... ...	Forceps tried first. A face presentation.
Great force . .	Recovery	... ...	Forceps tried first.
Tedious & difficult	Not stated	... ...	Forceps tried first.
Not without much difficulty . .	Recovery	... ...	Forceps tried first.
Much difficulty .	Recovery	... ...	Forceps tried first. Next child delivered naturally at full period.
Difficult . . .	Not stated	... ...	Not able to apply the forceps.
Difficult . . .	Recovery	Retention of urine; violent inflammation of vagina; fever.	
Not stated . .	Recovery		
Not stated . .	Recovery	... ...	Not able to apply the forceps.
Not stated . .	Death	... ...	Convulsions. Forceps tried first.
Tedious & difficult	Recovery	Slight uterine inflammation.	
Not stated . .	Recovery	Hemorrhage . . .	Face presentation.
Not stated . .	Recovery	Severe inflammation of uterus	Many efforts made at turning.
Difficult . . .	Recovery.		
Not difficult . .	Recovery.		

No. of Case.	No. in Report.	Cause of Obstruction and Delay.	No. of Pregnancy.	Length of Labour before Operation.
29	61	Head in the pelvis, and an ear felt . . .	...	Twenty-four hours .
30	62	Os uteri rigid and partially dilated. Head compressed in the brim	1	Seventy-two hours .
31	63	Head fixed in the brim	1	Above 24 hours . .
32	64	Head of child passed into the pelvis. Labia swollen to the size of a child's head	...	First stage very protracted
33	65	Great distortion of the pelvis	1	Thirty-six hours .
34	66	Head fixed in the brim ; pelvis small . .	1	Forty-eight hours .
35	67	Head above the brim	1	Great protraction (above 24 hours)
36	68	Small pelvis ; os uteri rigid	1	Forty-six hours . .
37	69	Great swelling of soft parts	1	About 72 hours . .
38	70	... ...	...	... ...
39	71	Os uteri half dilated		Twenty-four hours .
40	72	... ...	...	... ...
41	73	... ...	2	Above twelve hours
42	74	Distortion of pelvis	...	After great protraction
43	75	Head half through brim	1	Above thirty hours
44	76	Distortion of pelvis ; head not in cavity of pelvis	1	About 72 hours . .
45	77	Head scarcely entered the brim . . .	...	About 48 hours .
46	78	Head firmly compressed between sacrum and pubis	...	Forty-eight hours .
47	79	Distortion of pelvis ; head in the brim . .	2	Above 48 hours .
48	80	Distortion of pelvis ; head above the brim .	1	Thirty-six hours .
49	81	Distortion of pelvis ; greater part of head still above brim	1	Above 48 hours .
50	82	Head firmly jammed in the pelvis . . .	3	Above 15 hours . .
51	83	Head fixed in the brim	4	Above six days . .
52	84	Head firmly fixed in the brim	10	About 24 hours . .
53	85	... ...	...	About 30 hours . .
54	86	Contraction of pelvis	...	... ...
55	87	Distorted by rickets ; head above the brim .	1	Nearly 60 hours .
56	88	Head firmly impacted in the pelvis . . .	...	Forty-eight hours .
57	89	Head so low in pelvis that an ear was felt ; closely surrounded by the inflamed vagina	...	Seventy-two hours .

Difficulty or not in Extraction.	Death or Recovery of Mother.	Other Results. Inflammation, Sloughing, etc.	Remarks.
Not stated . .	Recovery	... ...	Vectis and forceps tried first.
Not stated . .	Death	Great inflammation and sloughing.	
Not stated . .	Recovery.		
Not stated . .	Death	Gangrene of vagina and external parts.	
Not stated . .	Recovery.		
Great force . .	Recovery	... ...	Not able to apply the forceps.
Not stated . .	Recovery.		
Not stated . .	Recovery.		
Not stated . .	Recovery	... ...	First tried forceps. Twins.
Not stated . .	Recovery	... ...	Violent puerperal convulsions.
Not stated . .	Recovery	... ...	Placenta prævia.
Not stated . .	Recovery	... ...	Puerperal convulsions.
Without much difficulty	Death	... ...	Rupture of uterus.
Not stated . .	Recovery.		
Not stated . .	Recovery	... ...	Retained placenta.
Great force . .	Recovery	... ...	Soft parts must have been severely contused.
Difficult . . .	Recovery	Uterine inflammation	Delivered by craniotomy before.
Great force . .	Recovery	... ...	Right parietal bone of the child depressed and fractured.
Not stated . .	Recovery	... ...	First child delivered by craniotomy.
Slowly	Recovery	.. ..	The operation lasted two hours, and the bones of the skull were all torn to pieces before the head could be extracted.
Difficulty . . .	Recovery	... ...	Next child delivered without aid. The breech presented.
Easily	Recovery	... ...	Convulsions occurred.
Readily . . .	Recovery.		
Difficulty . . .	Recovery	Retention of urine; sloughing of vagina; vesico-vaginal fistula.	
Easily	Recovery	Sloughing; vesico-vaginal fistula.	
Extreme difficulty	Recovery	... ...	A dwarf. The operation lasted nearly five hours, and the head of the fœtus could not be drawn through the brim of the pelvis, until the bones of the base of the skull were all torn to pieces.
Delivered by turning	Recovery	Uterine inflammation	Turning resorted to in consequence of an arm having been brought down by the crotchet.
Great force . .	Recovery.		
Some difficulty .	Recovery	Retention of urine; violent inflammation and sloughing; cicatrix left in vagina.	

No. of Case.	No. in Report.	Cause of Obstruction and Delay.	No. of Pregnancy.	Length of Labour before Operation.
58	90	Head at the external parts	1	Seventy-two hours
59	91	Pelvis distorted; head in the brim	...	...
60	92	Part of the head above the brim; os uteri partially dilated	1	Very protracted
61	93	Head wedged in the brim	...	Very tedious
62	94	Greater part of head above the brim	1	Fifty hours
63	95	Head squeezed in the brim	...	Forty-eight hours
64	96	Head firmly impacted in the brim	1	Seventy-two hours
65	97	Head jammed in brim; distortion of pelvis	...	...
66	98	Head far advanced into the pelvis; vagina swollen	1	Fifty-three hours
67	99	Head compressed in brim; os uteri partially dilated	1	Seventy-two hours
68	100	Head has scarcely entered the brim; os uteri rigid and not half dilated	1	Thirty-eight hours
69	101	Head deep in the pelvis, great swelling of the vagina, etc.	...	Thirty-seven hours
70	102	Os uteri partially dilated; head above brim	1	Forty hours
71	103	Head and right arm presenting; os uteri half dilated	2	...
72	104	Head fixed in brim; vagina swollen and tender	...	About 72 hours
73	105	Head strongly compressed in the brim; os uteri not fully dilated	...	Above 30 hours
74	106	Soft parts immensely swollen	...	Very protracted
75	107	Head firmly wedged in the brim; vagina swollen and tender	...	Above 78 hours
76	108	Head not passed brim	...	Forty-eight hours
77	109	Head impacted in the brim	1	Forty-one hours
78	111	Distortion of the pelvis; head compressed in the pelvis	...	Eighty-six hours
79	112	Distortion of the pelvis; head not in brim	1	About 48 hours
80	113	Distortion of the pelvis; head above brim	...	Above 62 hours
81	114	Head above the brim; os uteri not completely dilated	...	Above 78 hours
82	115	Greater part of the head above the brim	1	Above 53 hours
83	116	The head would not pass till perforated, being distended with fluid	...	...
84	117	Head above brim, and distended with fluid	1	Nearly 60 hours
85	118	Head above brim, and distended with fluid	1	Long in labour
86	119	Head distended with fluid	...	...
87	120	Head distended with fluid	...	Above 21 hours

Difficulty or not in Extraction.	Death or Recovery of Mother.	Other Results. Inflammation, Sloughing, etc.	Remarks.
Not stated . .	Recovery	Retention of urine; sloughing	The tumefaction of the labia and vagina was such that the blades of the forceps could not be introduced.
Not stated . .	Recovery	... ...	An unsuccessful effort had been made to deliver with the forceps.
Not stated . .	Recovery	... ...	Delirium for nearly a day.
Not stated . .	Death	Inflammatn. of bladder	
Not stated . .	Recovery		
Not stated . .	Recovery		
... ...	Recovery	Sloughing; vesico-vaginal fistula.	
Not stated . .	Recovery	... ...	Face presentation. Bursting of a thrombus of the vulva.
Not stated . .	Recovery		
Not stated . .	Recovery		
Not stated . .	Recovery		
Tedious . . .	Recovery		
Great force . .	Recovery		
Not stated . .	Recovery		
Not stated . .	Recovery		
Great force . .	Recovery		
Two hours required	Recovery	Retention of urine and sloughing of vagina.	
Great difficulty .	Death	Uterine inflammation	Perineum slightly lacerated; retained placenta; slight hemorrhage.
Easy	Recovery		
Much force . .	Recovery		
Not stated . .	Death		
Great force . .	Recovery		
Not stated . .	Recovery		
Not stated . .	Recovery	... ...	There was a peculiar thickening at the upper and back part of the vagina, which seemed to arrest the progress of the head.
Force required .	Recovery		
... ...	Death	Inflammation of muscular coat of uterus.	
Easy	Death	Inflammation of uterus	
Easy	Death	Disease of chest; inflammation of veins in pelvis.	
Easy	Death	Rupture of uterus	Placenta prævia. Child turned first.
Little difficulty .	Death	Rupture of uterus	Child turned.

In most of the eighty-seven cases in the preceding table, the operation of embryulcio was performed while the volume of the head was still above the brim. In the detail of many of the cases, Dr. Lee mentions whether the operation of extraction, after the skull was opened, was difficult or not; in thirty, however, of the eighty-seven, he particularly notes the extraction of the perforated head with the crotchet as having been attended with difficulty and force. The footnote below[1] contains a list of these thirty cases, and Dr. Lee's own expressions with regard to the degree of difficulty met with in each case, in this, the second part of the operation—viz. the extraction with the crotchet. In twenty-two of these thirty cases it is stated that the head of the child was not through the brim at the time craniotomy was performed, but required to be pulled through it with the crotchet. In most of the remaining eight cases the position of the head at the time of operating is not mentioned.

[1] Case 5.—"After perforation, great difficulty was experienced in extracting the head with the crotchet." Case 8.—"From the long-continued efforts required to drag the head into the cavity of the pelvis, it was evident that the delivery could have been accomplished in no other way with safety to the mother." Case 9.—"After perforation, strong efforts were required to complete the delivery, and she died within forty-eight hours." Case 16.—"The force afterwards required to extract the head with the crotchet made us regret that we had not interfered sooner." Case 29.—"After perforation, the head was extracted with difficulty by the craniotomy forceps." Case 31.—"The head was perforated, and the force afterwards required to extract it with the craniotomy forceps was so great, that I regretted having endeavoured to deliver before lessening the volume of the head." Case 32.—"After perforation, so much force was required to draw the head through the pelvis with the craniotomy forceps, that I regretted having attempted to save the child." Case 34.—"The extraction of the head with the crotchet was a tedious and difficult operation." Case 35.—"I did not succeed without much difficulty in delivering with the craniotomy forceps." Case 38.—"I opened the head, and had much difficulty afterwards in drawing it down with the crotchet." Case 39.—"Perforation and extraction difficult." Case 40.—"Extraction difficult." Case 56.—"Extraction with the crotchet tedious and difficult." Case 59.—"Extraction difficult." Case 66.—"Great force required to extract." Case 76.—"The bones of the cranium were all torn away with the crotchet before I succeeded in drawing the base of the skull through the brim of the pelvis. * * Great force was afterwards required to drag the shoulders into the cavity of the pelvis." Case 77.—"The operation of craniotomy was difficult." Case 78.—"Great force was required to extract the head after being opened." Case 81.—"The difficulty experienced in extracting the head with the crotchet after it was opened, proved that delivery could not have been completed by any other method." Case 84.—"After the head had been opened, two hours elapsed before I could extract it with the crotchet." Case 86.—"The operation lasted nearly five hours, and the head of the fœtus could not be drawn through the brim of the pelvis until the bones of the base of the skull were all torn to pieces with

Out of the thirty cases presenting the subjoined degree of force and difficulty in the extraction of the head, two only of the mothers died. In the remaining fifty-seven cases, either the extraction is noted as easy, or was not so difficult as to have been considered worthy of being noted; and out of these fifty-seven cases, thirteen mothers died. The following arrangement expresses these results in a tabular form:—

TABLE X.

TABLE OF EIGHTY-SEVEN CRANIOTOMY CASES, REPORTED BY DR. LEE, SHOWING THE NUMBERS IN WHICH EXTRACTION WITH THE CROTCHET WAS—1, NOTED AS DIFFICULT; OR, 2, NOT NOTED AS DIFFICULT; AND THE RESULTS OF THESE TWO CLASSES.

Extraction of the Head after Perforation.	Number of Cases.	Number of Deaths.	Proportion of Deaths.
Noted as difficult .	30	2	1 in 15
Not noted as such .	57	13	1 in 4½

These interesting facts evidently point to one conclusion—viz. that in distorted pelves, the amount of force required for the delivery and extraction of the head of the child, in cases of craniotomy, and hence also in cases of turning, has far less influence upon the ultimate results and mortality of the operation than we could well have anticipated. But I anxiously desire not to be misunderstood on this point. I by no means wish to maintain that the degree of force used in delivery has no influence upon the resulting degree of danger and mortality to the mother. Nothing could be more different from either my intentions or my convictions. But the above table shows that in the ordinary forms of distorted pelvis, the degree of force employed for effecting the transit of the head is far less an element of danger than could have been previously imagined; and the explanation of the apparent paradox is, I believe, twofold. For,

the crotchet." Case 88.—"After the perforation, so much force was required to extract the head, as to make it certain that the head could never have been extracted without its size being reduced." Case 89.—"I opened the head, and had some difficulty in extracting it." Case 102.—"Great force required to extract." Case 105.—"The head required great force to extract it after perforation." Case 106.—"Two hours required to extract the head with the craniotomy forceps." Case 107.—"Great difficulty in extracting the head." Case 109.—"So much force required to extract the head that it was obvious it never could have been delivered with the forceps, or expelled by the natural efforts." Case 112.—"The extraction required great force." Case 115.—"The force required to extract the head after perforation rendered it obvious that the head could never have passed in the exhausted state in which she was."

first, *temporary* compression applied to two special points in the circle of the pelvis (as in the case when the child's head is dragged, by operative measures, through a brim contracted only in one diameter) is by no means so dangerous as more *prolonged*, though slighter, degrees of compression of the maternal structures, when the compression is equable, and diffused over the whole circle of the pelvic aperture, or the whole interior of the pelvic cavity, as in instances in which a hydrocephalic fœtal head is pressing like an hydraulic bag, equally, and on all sides. But, secondly, the effect of the law of the influence of force is counteracted by, and subsidiary to, another law of a far higher degree of practical generalisation—viz. the law which I have illustrated at length in a preceding section, that "the danger attendant upon parturition increases in a ratio progressive with the increased duration of the labour." And I have little doubt that if we had proper and adequate data for conducting the inquiry, it would be found that the safe result of those craniotomy cases in which force is employed in the delivery is in a great measure owing to the *time* of the labour at which the delivery is accomplished; and that when the result is fatal, it is as much owing to the previous length or duration of the labour, as to the force employed. Dr. Collins, in his chapter on still-born children, details eight cases of craniotomy in which, after perforation, the extraction of the head with the crotchet required more or less severe exertion and force.[1]

[1] These eight cases are the following:—1. "No. 49 was forty-eight hours in labour of her first child. Having made no progress for the last twenty-four hours, the pulse becoming extremely quick, with great general debility, the head was lessened, and delivery effected by the crotchet. Considerable difficulty was experienced in getting the head through the pelvis, in consequence of the hand having descended with it."—*Practical Treatise*, p. 462. 2. "No. 56 was a diminutive woman, much deformed; had been twice force-delivered in this Hospital, as from the size of the pelvis it was impossible for a child to pass entire; even after the bones of the head were completely broken down, much difficulty was experienced in completing the delivery." 3. "No. 209 was admitted, reported to have been four days in labour, and attended by a midwife; the uterus continued to act strongly, yet after waiting eleven hours the labour made no progress, and, as there was no doubt the child was dead, the head was lessened. Many of the bones were removed before the delivery could be completed; the child was large and putrid." 4. "No. 210; after three days' labour, the head, still at the brim of the pelvis, was lessened, and almost every bone removed before it could be delivered, and even after it was brought down much exertion was required to free the shoulders and body. The child was large, and the abdomen somewhat distended with air. The mother seemed at this time almost lifeless, having lost the power of swallowing. The hand was introduced into the uterus, which was quite relaxed, the placenta was gently removed, and the patient expired immediately. On dissection, the uterus was found healthy, but badly contracted,

One of the eight patients died, but she had been seventy-two hours in labour when the operation was undertaken; all the other seven recovered. In six out of these seven cases, craniotomy was adopted earlier; in one, before the labour had reached sixteen hours in length; in all, before it had passed forty-eight hours from its commencement.

The manner and extent in which the laws of danger attendant upon this and other particular obstetric operations are controlled by, and absorbed in, the more general law of the attendant mortality, depending upon the length or duration of the labour, have been already illustrated (see Section IV.), in reference to delivery by the forceps, and delivery by the crotchet, taken individually. The law and its results, however, are so extremely important, as bearing upon the question of the present section, that I will, in further confirmation of it, and at some risk of repetition, throw into a combined

containing a small quantity of coagulated blood; the intestines were in the highest state of congestion, and there was about a pint of fluid in the abdominal cavity, with portions of coagulable lymph in different parts, seemingly the effects of inflammation previous to labour. On opening the chest, the lungs were observed to adhere so firmly as to require the knife in many places to separate them. Nothing was discovered to account for the suddenness of death." 5. "No. 256 was thirty-two hours in labour previous to admission; her pulse was rapid, and tongue foul. She was delivered some hours after she came in, by lessening the head, which was greatly enlarged from hydrocephalus; there was some difficulty in completing the delivery, even after the bulk of the head had been as much as possible reduced." 6. "No. 303 was admitted, reported to have been three days in labour of her first child; the head was low and firmly fixed in the pelvis; the bladder greatly distended with urine; it having been retained for thirty hours; pulse 140; tongue dry and white. The catheter was passed, and three pints of urine removed. As the abdomen was free from pain, it was thought advisable to watch the effect of uterine action for some time. After waiting five hours, during which the pains were pretty brisk at intervals, still the head made no advance; it was lessened and brought away with the crotchet. There was considerable exertion required to bring down the shoulders; the abdomen was much distended with air, the consequence of putrefaction. She died on the fourth day from delivery." 7. "No. 667; the labour lasted thirty hours; the head was firmly fixed in the pelvis, and had made no progress for twelve hours. As the heart's action had some time ceased, and the mother's pulse was 140, the head was lessened. Great exertion was necessary to effect delivery, in consequence of the head being much ossified." 8. "No. 725; this patient, when admitted, was reported to have been sixty hours in labour; the os uteri was very little dilated, and the head high up in the pelvis. The pains continued constant for twenty-four hours after she came in, yet the labour made little progress; the mouth of the womb was rigid, jagged, and had the feel of cartilage. The child being dead, as indicated by the stethoscope, the head was lessened and left in that state for some hours, and afterwards cautiously brought down. Considerable force was necessary to complete the delivery, though the child was putrid."

form and table all the forceps and all the craniotomy cases mentioned by Dr. Collins in which he specifies the duration of the labour. In other words, we will conjoin the two tables previously given in Section IV. into one; and examine how much the maternal mortality was modified in tedious and laborious labours, requiring instrumental aid, by the date of the labour at which that aid was given. Our former tables contained 24 cases delivered by the forceps, and 77 delivered by craniotomy; in all 101 instrumental labours. The results were as follows:—

TABLE XI.

Showing the Results of 101 Instrumental Deliveries in which the Duration of Labour at the time of the Operation was noted.

Duration of Labour.	Number of Cases.	Number of Deaths.	Proportion of Deaths.
Under 24 hours .	32	2	1 in 16 died.
From 25 to 48 hours	42	6	1 in 7 died.
Above 48 hours .	27	11	1 in 2½ died.
Total .	101	19	1 in 5 died.

This combined table of Dr. Collins' instrumental deliveries fully bears out the important conclusion regarding the influence of the antecedent duration of labour, that we have already seen to be derivable from the study of the two operative measures, the forceps and crotchet, taken singly and individually. The evidence of the present table, like the evidence of those previously given (see Tables V. and VI.) amounts to this—that the maternal mortality accompanying instrumental delivery is regulated more by the period of the labour at which the artificial interference is practised, than by the nature of the operation itself, or by any other contingent circumstance—the general fatality being decreased in proportion as the operation is performed early, and increased in proportion as it is postponed and delayed longer and longer from the date of the first commencement of parturition. But, admitting that this holds true in regard to instrumental delivery by the forceps and craniotomy, it may be doubted and objected that it perhaps does not hold true in regard to artificial delivery by the operation we propose to employ, viz. turning. Let us interrogate Dr. Collins' facts, in order to obtain an answer.

In his Report of the Dublin Lying-in Hospital, Dr. Collins gives the result of thirty-three cases, in which turning was practised in

consequence of presentation of the shoulder or arm. In one of these cases the placenta presented, and I exclude it as thus containing a source of danger quite independent of the turning. Among the remaining thirty-two cases, there are two deaths, or one in sixteen; and twenty-four in which the date of the duration of the labour, at the time of turning, is stated as ascertainable. In only one of these twenty-four cases is the labour noted as having exceeded thirty hours in length, and this protracted case was an instance of twins, in which the second child presented preternaturally, and required turning. In twenty-one of the cases the labour was terminated before twenty-four hours; among these, one died—a case complicated before delivery by severe accidental hemorrhage; in three it was prolonged beyond twenty-four hours, and one of these three mothers died. When arranged in a tabular form, the results are as follows:—

TABLE XII.

Showing the Mortality accompanying Twenty-four Cases of Turning for Presentation of the Arm and Shoulder, as regulated by the previous Duration of Labour.

Previous Duration of Labour.	Proportion of Deaths of Mothers.
Below 24 hours	1 in 21 died.
Above 24 hours	1 in 3 died.

The data in the preceding table are not numerous, but still they will probably be allowed to be sufficient evidence of the fact, that the degree of maternal danger attendant upon turning, as upon other modes of operative delivery, is regulated and modified by the date of the labour at which the delivery is practised; artificial labours, like spontaneous labours, increasing in their mortality in proportion as the previous parturient action has been allowed to be increased and prolonged in its duration and length. Hence, also, necessarily follows the same deductions which I have already more than once adduced, viz.—

1. A means of artificial delivery, such as turning, which, in cases of pelvic contraction, would enable us to finish the labour at an early date, should, as a general rule, add greatly to the safety and chance of life of the mother, as compared with a means of delivery such as the long forceps or craniotomy, which cannot be usually and legitimately practised till a much later period after the commencement of parturition.

2. The facts I have adduced in the present section show that the exertion of force in artificial delivery is attended with comparatively little danger, provided always the delivery is early; and that the employment of it is by no means so hazardous as the simple long continuance and protraction of the labour.

3. All these deductions are only corollaries to the higher and more comprehensive law, that the degree of danger and fatality attendant either upon natural or morbid parturition, increases in a ratio progressive with the increased duration of the labour.

Section IX.—On the Comparative Danger of Local Lesions of the Maternal Organs (Vagina and Uterus), in Delivery by Turning, and Delivery by Instruments.[1]

As far as the observations in the preceding section go, they refer to the comparative degree of actual danger to the *life* of the mother under the opposite means of treatment, by which cases of labour, with arrestment of the head and distortion of the pelvic brim, may be treated. They refer merely to the question of the probable death or probable survival of the mother, under the two different lines of practice spoken of—viz. delivery by instruments and delivery by turning. But it is possible, that, under such a form of labour as we have been considering, the mother may survive, that she may escape with life, and yet the maternal passages and neighbouring soft parts may be so much damaged and injured, as to interfere, in a more or less dangerous or distressing manner, with the state of her future health and future happiness. The cervix uteri, or the walls of the vagina, are sometimes so contused, or become so inflamed, that gangrene and sloughing supervene, and lead to the formation of cicatrices and strictures; or, what is still more deplorable, this resulting gangrenous inflammation may produce fistulous communications between the vaginal canal, and the rectum, or urethra, or bladder. No consequence could be possibly more deplorable than this last—the occurrence of recto-vaginal or vesico-vaginal fistulæ.

Speaking of sloughing of the urethra or neck of the bladder, as a consequence of severe labour, Dr. Collins remarks, in words dictated by the best possible feelings:—"I do not know of any occurrence more calculated to render the patient's life one of endless sorrow; or, at the same time, more likely to cause the practitioner

[1] See *Provincial Medical and Surgical Journal*, January 10, 1849, p. 9.

such lasting regret. When it unfortunately happens, as in some instances is unavoidable, in consequence of the protracted length to which we are at times compelled to permit the labour to proceed, owing to great difficulty in the passage of the head, the child being *alive*, here the medical attendant's mind cannot, on his *own* account, feel distressed, as the *only* means he could adopt to guard against the danger would be to lessen the head, which, in my opinion, no consideration should induce him to do under such circumstances."[1]

Are such distressing results as Dr. Collins here describes more liable to occur under the present practices of delivery by instruments, or under the new practice which I propose of delivery by turning? In other terms, the question which I wish to consider is this:—

Are Local Lesions from Inflammation of the Vagina, such as Sloughing, Fistulæ, etc., more liable, in a Contracted Pelvis, to supervene after Delivery by Turning, or Delivery by Instruments?

Vaginal inflammation, terminating in sloughing, cicatrices, and fistulæ, is not unfrequently observed after protracted labours that are terminated by the forceps or crotchet. In his *Clinical Midwifery*, after detailing "the histories of fifty-five cases of difficult parturition in which the forceps was employed," Dr. Lee remarks,[2] "Five of the mothers whose cases have now been related died from puerperal convulsions, and four from the rash and inconsiderate use of the forceps; seven had the perineum more or less injured; one the recto-vaginal septum torn; five were left with cicatrices of the vagina after sloughing; and one with an incurable vesico-vaginal fistula." After describing the histories of sixty-five cases of "difficult labours from distortion of the pelvis, swelling of the soft parts, convulsions, hydrocephalus in the fœtus, and other causes in which delivery was effected by the operation of craniotomy," Dr. Lee again observes,[3] "In thirty-eight of the cases in this report, the labour continued from forty to seventy hours. In the cases of spontaneous rupture of the uterus and convulsions only, was the delivery effected before the labour had lasted upwards of thirty hours. In a very large proportion of the cases, the difficulty arose from distortion, or a contracted state of the pelvis. Rupture of the uterus took place in three before perforation, and the inflammation and sloughing of the uterus, vagina, and bladder, which proved fatal to eight others,

[1] *Practical Treatise*, p. 359. [2] *Clinical Midwifery*, p. 32. [3] *Ibid.* p. 59.

were chiefly or solely produced by the long-continued violent pressure on the soft parts by the head of the child before it was opened and extracted. In those who recovered with vesico-vaginal fistulæ, or contraction of the vagina from cicatrices, the unfortunate occurrences arose from craniotomy being too long delayed."

In the table which I have previously given from the same author (see Table IX.) of the results of 87 cases of craniotomy, local lesions on the part of the mother are noted as having occurred in several instances. Out of the 87 cases, eight,[1] or about, in every 10, suffered from vaginal inflammation and sloughing; four,[2] or nearly 1 in every 20, were left with vaginal fistulæ.

On the other hand, I am not aware of a single recorded instance in which vaginal sloughing and fistula ever followed transverse presentations of the fœtus, and where the delivery is, as a general rule, always accomplished by turning. Two circumstances lead to this immunity:—

1*st.* In presentations of the arm and shoulder, the presenting part does not so completely fill up and compress the tissues of the brim as in head-presentations. Hence both the tendency to, and the occurrence of, congestion of the vessels and inflammation in the tissues, situated below the site of the compression—viz. the vagina, etc.—is far rarer. But—

2*dly.* The delivery is always, or almost always, accomplished early in the labour, and no doubt the mere length and protraction of the labour is one of the great, if not the greatest, predisposing and exciting causes of gangrenous inflammation and sloughing of the vagina.

In many cases vaginal sloughings and fistulæ have been attributed to the use of instruments, when they were more truly owing to gangrenous inflammation and sloughing, ensuing in consequence of the delay that was allowed to occur before instrumental delivery was adopted. In the history of most instances of vesico-vaginal and recto-vaginal fistulæ following labour, there is one simple fact, proving that they are not the direct effect, as is too often supposed, of lesions and lacerations by the forceps or crotchet. If vesico-vaginal fistulæ were, in this way, the direct effect of injuries produced by cutting with the instruments, then escape of urine through the vagina would be observed immediately after labour. But this is rarely the case; the general fact being, that the escape of urine

[1] See Cases 10, 20, 30, 32, 57, 58, 61, 74.

[2] See Cases 1, 52, 53, 64.

through the false opening between the urinary and vaginal canals is not seen for several days after delivery; because it is not till several days have elapsed, that the gangrenous slough in the parietes of these canals separates. No soft parts, any more than the maternal canals, could stand, without endangering their vitality, the steady pressure of a firm body upon them for twenty or thirty hours, such as that which the detained fœtal head exerts in contracted pelves upon the two points of contraction—the symphysis pubis before, and the promontory of the sacrum behind. It is not a matter of wonder that the soft structures compressed at these special points between the fœtal head and maternal bones, should sometimes inflame and slough. It is rather, perhaps, surprising, that this consequence does not oftener follow. On this point Dr. Beatty of Dublin makes one or two remarks of such importance, that I shall offer no apology for quoting them at length. "With respect," says he, "to laceration and sloughing of the vagina, bladder, etc., stated by some authors to be caused by the forceps, and used as an argument against their employment, I am of opinion, that in the majority of cases, when these lamentable results occur, the blame is unmerited; because I have seen the worst inflammation and sloughings of these parts follow in cases where the perforator had been used, and even in some where no instrument whatever was employed. The truth is, the mischief is effected by the pressure of the infant's head upon the soft parts of the mother, and after this has been continued with sufficient intensity, for a sufficient length of time, the inflammation caused thereby will run its course, no matter in what way delivery is accomplished, whether by the natural efforts or by instruments. But it frequently happens that delivery is effected in these cases by instruments, *too late* to prevent the unhappy results alluded to, and then the operation is charged with the consequences. If an accurate account of the subsequent condition of all women after delivery could be obtained, I much fear that the histories of those cases in which labour had been allowed to run too long before interference, would be anything but satisfactory. The lamentable sloughings of the vagina, with subsequent closure of the passage by the process of cicatrisation, or the still more distressing sloughing of the bladder, with its attendant urinary fistulæ, are seldom mentioned in lying-in hospital reports, because the patients are usually removed from those institutions *before* such results have become very apparent; and thus, a case left to nature

in which delivery is effected by the natural efforts, is set down as a favourable one, without any notice of its consequences."[1]

Dr. Beatty elsewhere soundly and correctly remarks, in regard to the causation of gangrene and sloughing, etc., of parts of the vaginal walls by the pressure of the child's head, "that it is the *continuance* of the pressure that does the mischief rather than its *intensity*. We know that the soft tissues of the body are endowed with a resiliency —a power of resistance that enables them to bear a temporary compression of great amount without injury, while inferior pressure continued for a length of time will terminate in their disorganisation. The malingering soldier is well aware of this fact, and acts upon it when he wishes to produce an ulcer. He straps a piece of coin or other hard substance tightly upon the part. At first no effect is produced, and if the apparatus is removed in a short time, there is no evil consequence ; but if the same amount of pressure is continued for some hours, such a degree of injury is inflicted as terminates in the destruction of the part, and a sloughing ulcer is the result."[2]

That the mere morbid protraction of labour is the great predisposing cause of gangrenous inflammation and sloughing of the vagina, as suggested in these remarks, is shown by Dr. Collins' results. Dr. Collins has recorded the duration of the labour in six cases where sloughing of the vagina was detected after death. The following table shows that the accident occurred in an immensely greater proportion in prolonged than in short labours ; and that, consequently, protraction is, as I have just stated, almost a necessary antecedent to the occurrence. The case, I may remark, in which sloughing followed a labour less than twenty-four hours in duration, required instrumental delivery, but the mode of delivery, whether by the crotchet or forceps, is not specialised by Dr. Collins.[3]

TABLE XIII.

DURATION OF LABOUR IN SIX FATAL CASES OF SLOUGHING OF THE VAGINA.

Length of Labour.	Number of Deliveries.	Number of Cases.	Proportion of Cases.
Within 24 hours .	15,586	1	1 in 15,586
Beyond 24 hours .	264	5	1 in 53

[1] *Dublin Journal of Medical Science*, vol. xii. p. 290.

[2] *Dublin Quarterly Journal*, vol. 21, p. 344. [3] See *Practical Treatise*, p. 358.

If, as these data show, the protraction of labour is a main and almost necessary element in the production of gangrenous inflammation of the vagina, it is equally evident that turning, in the class of cases we are considering, while it frees the mother from the danger of a fatal termination, as shown in the last section, would at the same time free her also from the chance of suffering from these *local* complications that are apt to follow upon protracted labours.

In the passage which I have quoted from Dr. Collins, at the commencement of the present section, that experienced practitioner laments our being occasionally compelled to subject our patients to the chance of local dangers and complications, in consequence of our being compelled, in some unavoidable instances, to allow the labour to proceed onward to a protracted degree, from the child being still alive, "for then the *only* means the practitioner could adopt to guard against the danger, would," says Dr. Collins, "be to lessen the head, which, in my opinion, no consideration should induce him to do under such circumstances," viz. as long as the infant is still living. The proposition which I have made of turning in such instances resolves the difficulties attending upon them, in two ways. For, *first*, it enables us to deliver the patient early and at once, and thus frees us from the dread of these consequences of protraction; and, *secondly*, the continued vitality of the infant would, under the treatment by turning, not be a reason and incentive for our dangerously delaying the delivery, but would form a strong reason and incentive for our proceeding with the practice at as early a period as is proper and possible. The details of a case or two may enforce these observations; and I shall select some from Dr. Collins, calculated both to illustrate these remarks, and to show, that in protracted labours, occasionally *before* the time that the child does at last die, the dreaded amount of local mischief has been accomplished, so that if we waited always for the certainty of the infant's death, in order to deliver by craniotomy, we should wait beyond the time that was necessary, in order to save (locally) the maternal structures from inflammation and gangrene.

It will be remarked, that in the first of the following instances, the fœtal heart was heard six hours, and in the second case eight hours, before delivery, and consequently ceased some time between these periods and the period at which the perforator was used—in short, necessarily not long before craniotomy was practised. Consequently we have here cases which, in the severity of their local, and, I may add, in the severity also of their general symptoms, show what

I have before argued, that the mother may herself be assuredly placed in the greatest possible danger and hazard from the protraction of the labour, before that protraction kills the child. I may add, that, in the first case, the position of the fœtal heart, viz. in the right iliac region, showed the infant to be in the occipito-posterior position (the third position of Naegele).

Case XXXVI.—"No 126. This woman was fifty-nine hours in labour; it was her first child. The pains were for a considerable time very trifling, with long intervals; however, for the last twenty-four hours, the uterus acted with tolerable regularity, the pains being at times strong, causing the head to press with much force against the ischia, where it remained stationary for the greater part of that time. Her pulse was very much increased in frequency, varying between 120 and 130; the external parts were œdematous. As the fœtal heart had ceased to act, having been distinctly audible in the right iliac region six hours before, the head was lessened, and the crotchet applied. The placenta was expelled in forty-five minutes, immediately after which, in consequence of hemorrhage, the hand was introduced, and so it was arrested. Violent inflammation and sloughing set in, resisting all treatment, and she died on the 9th day. For four days previous she had severe diarrhœa, a succession of motions coming on suddenly, with severe pain; she had also severe hiccough. On examination after death, the vagina was found in a state of slough; the sides opposite the spines of the ischia were broken through with the slightest force, and were completely gangrenous. A circular opening the size of a shilling was found, forming a communication between this cavity and the rectum, the mucous surface of which, as also that of the colon, was softened, and had, in the vicinity of the opening, a gangrenous appearance. There was no symptom of inflammation in the peritoneum or uterus."[1]

Case XXXVII.—"No. 1091. Was admitted August 23d, in labour of her first child, and was not delivered until the 25th, being a period of fifty-six hours. Uterine action, from the commencement until within six hours of the expulsion of the child, was extremely feeble, with long intervals. The head remained high in the pelvis, and although the ear could not be reached, it was evident the head had sufficient room to pass; to effect which, uterine action was alone wanting. As soon as the pains began to be brisk, the labour proceeded without difficulty. The fœtal heart was quite audible until eight hours previous to the birth. In three hours after the hand was passed to remove the placenta, it was found separated, and without the slightest effort the uterus contracted and expelled both. The perineum had suffered considerably in the passage of the head. The patient never seemed to rally after delivery; the pulse continued quick; there was considerable tenderness on pressure over the uterus, with a foul discharge from the vagina. * * * On the 7th and 8th, she had distinct rigors, followed by perspiration, after which her strength became greatly reduced. The vaginal discharges continued foul, notwithstanding the most rigid attention to cleanliness and the use of stimulating injections. She gradually sank and died on the 11th day, having for two days previously suffered from frequent hiccough. On dissection, the only morbid appearances found were in the bladder and vagina. In the bladder, the mucous surface was covered with yellow lymph, and it contained a quantity of muco-purulent fluid. In the vagina, opposite the right ischium, a portion appeared to have been destroyed by slough."[2]

[1] *Practical Treatise*, p. 158. [2] *Ibid.* p. 483.

Hitherto, under the present section, I have spoken of the dangers which the mother may avoid by employing the operation of turning as a substitute for instrumental delivery, in cases of contraction of the pelvic brim. But while turning enables us, as I have shown, to eschew some of the gravest and most imminent dangers connected with the use of the long forceps and crotchet, it is, on the other hand, by no means to be forgotten, that it subjects the mother to one great form of danger, from which, in common belief, she would be comparatively free under the adoption of instrumental delivery. The special maternal danger attending upon turning is *laceration or rupture of the uterus*, confessedly the most fatal complication that can occur in connection with delivery. Is the liability to rupture under turning so great as to make us avoid this practice and trust rather to the forceps and crotchet? Or, in other words—

Is Rupture of the Uterus in Contracted Pelves much more apt to be produced by Delivery by Turning than by Delivery with Instruments?

Most authors describe laceration of the uterus as one of the principal hazards which the mother runs in cases of turning. But injury and laceration of the uterus are perhaps not so liable to follow this operation as is generally imagined. "Between the years 1823 and 1834," says Dr. Ramsbotham, "I delivered more than one hundred and twenty women under transverse presentations; independently of a few cases to which I was summoned where spontaneous evolution occurred. Many of these cases presented a formidable appearance; for in one, the membranes had been ruptured a whole week; in another, sixty-nine hours; in a third, fifty-eight hours; in another, fifty-five; in another, fifty-three; and in many, more than forty-eight; and as a general principle, we presume that the longer the liquor amnii has been evacuated, the more likely is the uterus to have embraced the fœtal body firmly, and the more difficulty will there be in overcoming the resistance. In none of these cases did I exhibit large doses of opium, and in those few where bleeding was practised, that operation was had recourse to, not for the purpose of relaxing the uterine fibres, but to relieve the inflammation which the soft structures were suffering, and to remove tumefaction. *In not one of these instances was any injury inflicted on the uterine structure; nor did any permanent evil arise that could be attributed to the operation.* In four cases only was the uterus so powerfully contracted as to refuse admittance to the

hand, and compel me to adopt the alternative of eviscerating or decapitating the fœtus."[1]

Besides that injury of the uterus is thus not so apt, as is perhaps generally imagined, to follow upon turning when carefully and cautiously performed, there are other considerations, which are calculated strongly to show that the danger of laceration in the cases of pelvic contraction most fitted for the practice we suggest, is not much, if at all, increased by the proposed operation. I shall state the considerations to which I refer.

In the *first* place, I would premise this important remark, that, according to all our best obstetric pathologists, those degrees and forms of morbid contraction of the brim of the pelvis which I deem to be the cases best adapted for delivery by turning, are exactly those cases in which, under any plan of management, whether the patient be delivered by the natural efforts, or by the forceps or crotchet, rupture and laceration are exceedingly apt to take place. On this subject I am anxious to adduce full evidence, and will consequently appeal to the unprejudiced testimony of Ramsbotham, Denman, Churchill, etc.

"Laceration of the uterus," says Dr. Ramsbotham, "is most likely to happen to a patient who has had three or four children, who possesses a slightly distorted pelvis, and who has been in strong labour for a number of hours. Although," he further observes, "the same rent may take place in any portion of the organ, its most frequent seat is at the neck, either at the posterior part opposite the prominence of the sacrum, or anteriorly, behind the symphysis pubis. The direction is also mostly transverse, or slightly oblique. It is not difficult to account for this being the most usual situation of the injury; for since, during the latter part of gestation, the neck of the womb rests upon the pelvic brim, if the promontory of the sacrum dip too far forward, or the ridge of the pubis be preternaturally sharp, it is reasonable to suppose that the uterine structure may be affected, that inflammation may occur as a consequence of pressure, and that a thinning or softening of the substance may be induced, and, under these circumstances, should the structure give way at all, it is likely that the weakened part will be the first to suffer. Denman, indeed, says that, independently of disease, the uterus may be *worn through* mechanically, in *long* and *severe* labours, by pressure and *attrition* between the head of the child and the projecting bones of a distorted pelvis, especially if they be drawn into points, or a

[1] *Obstetric Medicine and Surgery*, p. 350.

sharp edge. One or other of these causes may explain," Dr. Ramsbotham concludes, "why we more frequently meet with laceration of the uterus, when the pelvis is *slightly* contracted in the conjugate diameter of the brim, than when the distortion is *excessive.*"[1] And he adds one case. "In one of the last cases," says he, "of ruptured uterus to which I was called, dissection showed that the linea ileo-pectinea, where it traverses the pubis, was formed into a very sharp ridge, that there were a number of bony prominences jutting from the inner surface of the pubic bones towards the cavity, and one, especially, situated above the left thyroid foramen, which was so pointed as to pain the finger when hard pressure was made on it. The sacro-pubic diameter was two inches and three quarters in extent. It was the woman's second pregnancy; the first child had been delivered by craniotomy. After a consultation was held, labour on this occasion was induced in the eighth month by the exhibition of four doses of ergot. The membranes broke spontaneously three hours and a half before the accident occurred. I was sent for by the gentleman in attendance immediately, and delivered by turning; she died on the night of the fourth day."[2]

Dr. Churchill expresses similar views in regard to contraction of the pelvis as a cause of rupture. "A certain amount," says he, "of narrowing of the upper outlet may give rise to it. This is a purely mechanical cause. The head of the child is forced down by violent labour-pains, but is unable to enter the pelvis from the contraction of the upper strait. Now, if the pains continue with great power, the head is turned to one side or the other, or posteriorly, and the only obstacle here being the uterine or vaginal parietes, the head is drawn through them at the weakest part. They offer the less resistance, probably, from the woman having borne several children."[3]

Other authorities might be adduced to the same effect—viz., that rupture of the uterus is especially liable to happen under protracted labour or instrumental delivery, when the brim of the pelvis is slightly contracted, that is, in exactly the class of cases most likely to be adapted for delivery by turning.[4]

In the *second* place, let me observe that, while contraction of the

[1] *Obstetric Medicine and Surgery*, p. 469. [2] *Ibid.* p. 469.

[3] *Theory and Practice of Midwifery*, p. 408.

[4] See, for example, Dr. Roberton, *Edin. Med. and Surg. Journal*, vol. xlii. p. 61. "In a great majority of instances," says he, "of slight contraction of the inlet, in perhaps three cases out of four, the diminution of space is caused by the promontory of the sacrum encroaching upon the antero-posterior diameter. On this ground, perhaps, we may explain why, in a somewhat greater number of cases

pelvic brim is thus acknowledged to be a strong predisposing and exciting cause of rupture, it must, at the same time, be held in view as a most important correlative fact, that it seldom does lead to laceration of the uterus, unless the effects of its mischievous agency are allowed to be combined with, and increased by, a morbid degree of prolongation and protraction of the labour itself. Dr. Denman's observation is, doubtless, so far quite true, as to the possibility that the "uterus may be *worn through* mechanically, in long and severe labours, by pressure and *attrition* between the head of the child and the projecting bones of a distorted pelvis, especially if they be drawn into points, or a sharp edge."[1] In fact, the liability to rupture, like the liability to most other obstetric complications, increases progressively with the increased duration of the labour, as the following table, calculated from Dr. Collins' returns,[2] sufficiently attests:—

TABLE XIV.

Duration of Labour in 24 Cases of Rupture of the Uterus.

Length of Labour.	Number of Deliveries.	Number of Cases of Rupture.	Proportion of Cases of Rupture.
Within 6 hours	13,412	7	1 in 1916
From 7 to 24 hours	2,174	10	1 in 217
Above 24 hours	264	7	1 in 38

The principle inculcated by the evidence of this table is so important in its bearing upon the practice suggested in the present memoir, that I shall take an opportunity of enforcing it by adducing three instances of distorted pelvis, in which laceration of the uterus took place after the labour had been allowed to become protracted; and that, though the mode of ultimate delivery in each of the three was different, in the first, being effected spontaneously, in the second, by instruments, and in the third, by turning.

of laceration, the rent is found in the posterior rather than the anterior part of the uterus."

Out of 300 cases of rupture of the uterus, reported by Dr. Trask, *Monthly Journal and Retrospect* for August 1848, p. 178, contraction of the brim of the pelvis was found noted as existing in sixty cases. Drs. M'Clintock and Hardy, in their excellent work on Midwifery, observe, in regard to the pathology of rupture (p. 295), that the accident is more likely to be produced "where the deformity of the pelvis is *slight* than where it is excessive"—that is, in precisely those cases best fitted for turning.

[1] Ramsbotham's *Principles of Obstetric Medicine and Surgery*, p. 469.

[2] Dr. Collins met with 34 cases of rupture during his mastership. In 24 out of the 34 he has given the duration of the labours in a table in his *Treatise*, p. 370.

Case XXXVIII.—"No. 22. On the fifth day after delivery, without any apparent cause, was seized with violent hemorrhage. When we saw her, which was immediately after, no pulse could be felt, and, though most prompt and active measures were employed, she died in less than an hour. She had been delivered, by the natural efforts, of a living child, after a labour, not very severe, of forty-eight hours; nor from that time was there distress of any kind perceptible.

"On dissection, the abdominal viscera appeared healthy, as did the uterus at first sight, but on raising it out of the pelvis, about the size of a shilling of its muscular substance, corresponding to the projection of the sacrum, was found to have given way, the peritoneal covering remaining uninjured. There were two spots in the vagina approaching to a state of slough."[1]

Case XXXIX.—"No. 28. The labour-pains in this case were feeble, yet the child continued to advance. The heart's action was audible with the aid of the stethoscope, the mother's pulse natural, and no unpleasant symptom. Suddenly, however, the most alarming debility came on, the pulse being scarcely perceptible, accompanied with vomiting and much pain on pressure over the uterine region. Immediate delivery was necessary, and the perforator was used. She was a feeble, delicate woman, was thirty-six hours in labour previous to the setting in of the above symptoms, and had been force-delivered eleven months ago. She died in fourteen hours.

"On dissection, an opening was found at the junction of the uterus with the vagina (exactly opposite a projection of the last lumbar vertebra), not larger than to admit the passage of one finger. The muscular substance of the uterus, anteriorly, had also given way to a considerable extent, the peritoneum being whole. The pelvis scarcely measured three and a half inches from pubis to sacrum."[2]

Case XL.—"A patient with her spine somewhat curved, and who, in her first confinement, had borne a dead infant after several days' suffering, was taken in labour of her second child early on the 16th of November 1846. The pains had been constant and strong for about thirty hours, when I saw her, with Dr. Gordon, who had been called in, and the head had remained stationary and fixed at the same point of the brim for the last twenty-four hours. On examination, Dr. Gordon and I found the pelvis small, the os uteri fully dilated, and the head of the infant imperfectly entered into the brim, and apparently uninfluenced in its descent by the powerful uterine contractions that were present. The sutures of the fœtal head were strongly overlapping, and a triangular portion of the fœtal cranium, terminating in the posterior fontanelle, was driven deeply in and below the level of the two other portions of bone that went to the formation of that fontanelle. On first touching the head, I thought this indented bone was, as usual, the occipital, but a more careful examination showed me that it was the left parietal bone, and that the head presented its right side, instead of the vertex. The head, though thus greatly compressed transversely, still filled very imperfectly the pelvic brim, and the right side of the pelvis was so unoccupied as to allow a long loop of the umbilical cord to prolapse. The vessels of the cord were beating, showing the child to be still living. The local and constitutional symptoms under which the patient was suffering, showed the necessity of immediate interference and delivery; but how was the delivery to be accomplished? The mass of the head was too high above the brim to allow of the successful use of the long forceps, even if there were space sufficient (which was very doubtful) in the contracted pelvis, to allow of the head passing in this form. The perforation

[1] Dr. Collins' *Practical Treatise*, p. 287. [2] *Ibid.* p. 300.

and breaking up of the head by craniotomy would allow of delivery, but the cord showed the child to be alive, and I had doubts here, as in other cases, of the propriety of murdering the infant, when delivery by other means was possible; the other remaining means consisted in its extraction by turning, and, with Dr. Gordon's consent, I proceeded to deliver the patient by this operation; it was accomplished without much difficulty. The child was still-born, but was recovered by the usual means of resuscitation; it survived, however, only a few hours. That part of the scalp covering the parietal bone, which had infringed so long on the promontory of the sacrum, remained depressed, and pitted like an umbilical mark; the left parietal bone itself remained also deeply displaced, and indented below the corresponding edges of the occipital and right parietal, and, on dissection, some blood was found effused beneath it. The mother continued well for a few hours, but then began to sink, with symptoms of abdominal effusion and rupture. She died on the following day. On dissection, the neck and lower part of the body of the uterus were found lacerated, and at one part the oblique and valvular-like laceration extended through the peritoneum. The pelvic brim was obliquely ovate in form, the right side being much larger than the left, but the conjugate diameter of the brim was very narrow. At its most contracted point, a piece of wood wedged in between the promontory of the sacrum and the nearest point of the pubis, measured only two inches and seven-eighths. The pelvic joints felt loose and mobile."

The observations which I have adduced in the preceding pages seem, then, to point to the following deductions:—

First, Morbid contraction of the pelvic brim is, whatever mode of delivery is adopted, liable to be a cause of rupture of the uterus.

Secondly, This morbid contraction principally, and almost only, becomes a cause of rupture, when, in conjunction with it, the labour, as in the three cases just now detailed, has been allowed to become long and protracted in its duration, and the compressed tissues of the cervix are consequently rendered preternaturally friable and lacerable. Then—

Thirdly, It necessarily follows, that this complication would in all probability be avoided, when morbid contraction of the pelvis exists, provided either nature or art was enabled to deliver the patient early, and did not permit of the tissues of the lower part of the uterus becoming wedged in, contused, inflamed, and softened, between the presenting head of the infant and the opposing points of contraction in the pelvic brim. Hence a power of artificially terminating labours with this complication, as soon after their commencement as the dilatation or dilatability of the passages would allow, would be, so far, a means of averting this fearful accident under these circumstances. In the delivery by the operation of turning, we possess such a power; and by the exercise of it in these

cases we may, I believe, not only sometimes save the mother from danger, but the child also from death. And I have already shown at sufficient length, that the degree of force required to extract the head, will depress and groove the cranial bones of the child, without necessarily injuring or tearing the soft pelvic tissues of the mother; provided always these tissues have not been previously brought into a state of congestive and inflammatory friability by the previous duration of the labour, and by the impaction of the head having been allowed to be prolonged to an excessive and morbid degree. All the evidence which I have adduced in different parts of the present memoir goes to show this fact—that the danger attendant upon turning and other modes of operative delivery is, as a general law, regulated less by the mere performance of the operation, than by the degree of protraction allowed to elapse before operative interference is adopted. And, in addition, the evidence which was brought forward in the last section appears to entitle us to deduce, as a supplement or corollary to this important general law, that (supposing the maternal passages are once dilated or dilatable) when operative delivery by the forceps, or crotchet, or turning, is accomplished with *comparative force*, it is safer, *cæteris paribus*, to the mother when performed early, than the same or other modes of operative delivery would be if accomplished with *comparative facility*, but performed late;—that, in other words, force is less dangerous than protraction;—that the hazards of operative delivery are more regulated by the time of its adoption than by the difficulties of its accomplishment.

Fourthly, It must still be held constantly and prominently in view that, in the proposed practice of turning, the great maternal danger which the practitioner has to avoid, is injury and laceration of the uterus, and he must use all due care and caution to avert any chance of this accident. The preceding observations show some of the leading points and objects which he should attend to, in order to avoid it. These points are, principally—1, The early performance of the operation; 2, When possible (as in Case I.) it should be effected even before the membranes rupture, as turning is greatly more easy and more safe before, than after, the evacuation of the liquor amnii; 3, If the liquor amnii has escaped, and the uterus has contracted, the uterine fibres should be previously, and perfectly, relaxed by the use of opium or chloroform; and, 4, The part of the operation consisting in the actual turning and version of the child should be done with extreme caution, and only and always attempted

and accomplished during a perfect interval between two uterine contractions.

Other requisite rules and precautions are enumerated so fully in most obstetric works, and so well known to obstetric practitioners, that it is perhaps unnecessary to dwell here at great length upon them.

TURNING AS A SUBSTITUTE FOR CRANIOTOMY IN LABOUR DELAYED BY OBSTRUCTION AT THE BRIM OF THE PELVIS.[1]

Formerly, medical practitioners seem to have thought little, and medical writers said little, regarding the very repulsive and revolting character of the operation of craniotomy, when performed, as it frequently was, when the child was still living. Apparently, some obstetric practitioners and writers of the present day continue to look upon the practice of craniotomy as one that should not unfrequently be adopted, and one which it is quite justifiable to adopt. Obstetric reports and collections of cases have been published within the last few years, describing craniotomy as performed forty or fifty times, or oftener, by the hand of the same practitioner. But perhaps, ere long, it will become a question in professional ethics—Whether a professional man is, under the name of a so-called operation, justified in deliberately destroying the life of a living human being? For one, I have a strong conviction that, in the kind of case in which the operation is most frequently performed—namely, where there is some obstruction from disproportion, not very great in degree,[2] between the maternal pelvic brim and the fœtal head, the operation is not one which is either morally or pro-

[1] See *Edinburgh Monthly Journal of Medical Science*, February 1852, p. 135.

[2] During Dr. Collins' charge of the Dublin Lying-in Hospital, craniotomy was used in 124 cases; in 79 instances on account of tediousness or difficulty in the labour. In only one of these cases was the conjugate diameter of the pelvis as small as 2½ inches. "This," he says, "was *by much* the most defective pelvis I ever met with in the hospital." "The only means," he observes, "of effecting delivery, where the disproportion between the head of the child and the pelvis is so great as *to prevent reaching the ear with the finger*, is by reducing the size of the head, and using the crotchet."

In most cases requiring craniotomy, the contraction at the brim is in the conjugate diameter, from the projection forwards of the promontory of the sacrum—the very kind of deformity in which turning is most likely to be the means of saving the life of the infant.

fessionally justifiable, if the child be still living. Not many years ago, the medical practitioner had this one plea to urge in favour of the adoption of the operation—that *perhaps* the child was already dead ; inasmuch as there then existed no certain means of knowing that it was still alive. Auscultation, however, now furnishes us with certain means of settling this question in practice, and has consequently removed this argument in favour of the adoption of the operation. Or perhaps the result would be more correctly given by stating, that in cases of lingering and difficult labour, from some disproportion between the size of the fœtal head and maternal pelvic brim, auscultation can now determine the instances in which the child is dead, and in which, therefore, it is justifiable and right to have recourse to delivery by craniotomy ; while it shows us also, on the other hand, the strong impropriety and illegitimacy of adopting the same operation in other analogous instances, where the sounds of the fœtal heart indubitably prove, to the ear of the medical attendant, that the infant continues alive and well.

Assuredly no man would consider himself justified, on any plea whatever, in perforating, and breaking down with a pointed iron instrument, the skull of a living child an hour after birth, and subsequently scooping out its brain. But is the crime less, when perpetrated an hour before birth? Modern physiology has fully shown that there is no such distinction between the mental and physiological life of an infant, an hour before labour is terminated, and an hour after it, as to make any adequate distinction between the enormity of the act, as perpetrated at the one or at the other of these two periods. And, as if to add to the horrors of craniotomy, when performed upon a living infant, some authors (and among them even the very latest), tell us, that whatever doubts may have existed as to the child being alive or not at the date of operating, the results of the operation itself will decide this point ; for if it be alive at the time of the deadly perforation of its scalp, skull, and brain, this fearful fact will be revealed to the practitioner by warm and fluid streams of blood pouring along his fingers and hand, before any masses of broken brain escape ; or the reverse.

Unfortunately, no operation in morbid labours is more easy than craniotomy. "Of all instrumental operations in obstetric surgery," says Dr. Ramsbotham, "the perforation of the skull, and extraction of the mutilated fœtus, is the easiest which could be undertaken, for delivery in any case of compacted head ; and much do I fear that to the facility with which this operation can be accomplished,

have been sacrificed the lives of many children."[1] The operations which midwifery possesses as substitutes for craniotomy are, however, not very difficult in performance. And no conscientious practitioner would surely hold the mere difficulty of an operation, as the criterion by which he should decide upon the act of child-murder or not.

In women who, in previous labours, have had the children removed from them by the operation of craniotomy, nature has herself occasionally pointed out to us, in other labours in the same patients, various means and resources by which that operation could be avoided. Midwifery, as an art, has appropriated some of these hints, and happily applied them in practice. Ever and anon, women, who had been previously the subjects of difficult and dangerous labours, have, when parturition came on *accidentally*, at the seventh or eighth month, borne living children easily and safely. Accoucheurs have, in similar cases, taken advantage of this suggestion, and have had recourse to the *artificial* induction of premature labour. In other instances, in which previous labours have been found difficult or impossible without craniotomy, in consequence of the form of the maternal pelvis, a successful termination has occasionally occurred, when the child happened, in subsequent labours, to present with the feet or pelvic extremity, instead of the head. In such instances, the presentation of the feet or pelvis, or of a hand (requiring the presentation to be *ultimately* made footling), has sometimes, when first discovered at the commencement of labour, been regarded as a source of undoubtedly increased danger and difficulty ; when it has at last in reality proved a source of increased safety to the mother, and led indirectly to the preservation of the life of the infant.

The records of cases of difficult labour left us by Mauriceau, Smellie, Hull, etc., show, that in particular forms of difficult labour and deformed pelvis, the passage of the child by the feet or pelvic extremity affords some special facility of transit, which is wanting when the head or cephalic extremity forms the presenting part.

I believe that this apparent paradox is explicable by a reference to the anatomical structure or form of the fœtal head itself. At birth, the whole body of the child has, in its configuration, been justly compared to that of a cone—the arch, or bi-parietal diameter, of the skull forming the base of the cone—the feet forming its apex; and there being a gradual tapering and diminution of size from the

[1] *Obstetric Medicine and Surgery*, p. 290.

former to the latter points. But the fœtal head itself, when taken alone, presents also, though more imperfectly, the configuration of a cone; the base of the skull being considerably narrower than the arch, or, in other words, when (as represented in the accompanying woodcut) we make a vertical transverse section of the fœtal skull, we find its bi-mastoid diameter, *b b*, is considerably less than its bi-parietal diameter, *a a*,—the cranium increasing gradually in breadth and size from below upwards. The difference between these two diameters in the child at birth generally amounts to from half-an-inch to three quarters.

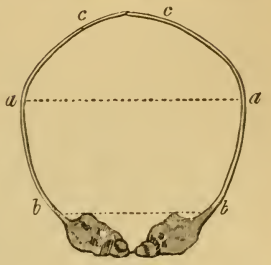

Fig. 16.

Further, it must be held in view, that at its base, or bi-mastoid diameter, the fœtal cranium is so strong, and its bones so strongly united, as to render it quite incompressible. On the other hand, in its arch, or bi-parietal diameter, the cranium at birth is generally so thin and elastic in its bony parietes, and its sutures are so imperfectly united, as to admit of the head being in its upper parts laterally compressed, or even depressed and indented, at some point, without necessarily destroying the life of the child.

In consequence of the above conformation, it happens, that when the child, in a somewhat contracted pelvis, passes as a footling presentation, the cone-shaped head of the child first enters the contracted brim by its *narrower*, or bi-mastoid diameter; and the hold which we have of the protruded body of the child, after its extremities and trunk are born, gives us, when necessary, the power of employing so much extractive force and traction upon the engaged fœtal head, as to compress the elastic sides of the *broader*, or bi-parietal, portion of the cone, between the opposite sides or parts of the contracted pelvic brim, to such a degree as to allow of the transit of the entire volume of the head. In natural labour, the mechanism consists in passing a conical-shaped body (viz. the child) through an aperture (the maternal pelvis) somewhat *larger* than the base of the cone itself (the arch of the fœtal skull); and in this case, when once the base of the cone or head does pass, a single pain is generally sufficient to expel the remainder of the infant—an arrangement by which dangerous compression of the cord is avoided by nature. But when the brim of the pelvis is somewhat less than the natural standard, or the head somewhat above that standard, either

from size or malpresentation, the conditions are so far altered, that we have now a conical-shaped body (the child) to be passed through an aperture (the brim of the maternal pelvis) somewhat *smaller* than the body that is to pass. And a little reflection is sufficient to show, that under such circumstances, the passing body would be more easily dragged through the contracted aperture, by bringing the narrow apex of the cone first, than it could be pushed through that aperture by allowing the base, or broad end of the cone, to be presented to it; more particularly, if that broad end is, as we have supposed, somewhat larger than the aperture through which it is to pass.

Since writing upon this subject at considerable length a few years back, I have repeatedly had occasion to turn the child in difficult cases, where the head was not far entered into the brim, and where the long forceps failed, or were contra-indicated; and in which the alternative of craniotomy seemed the only other measure that could be adopted. A number of my professional brethren have reported to me the success with which they have also followed this practice. In the way of illustration, I adduce the three following cases which have occurred in my own practice and in that of my friends Drs. Weir and Peddie, within the last few weeks. I have the pleasure of detailing the cases recently met with by Dr. Weir and Dr. Peddie in their own words.

Case I.—On the evening of January 11th, I was asked to see a case of lingering labour, under the charge of Mr. Keeling and Dr. Cooper. The patient, æt. 26, and pregnant for the first time, had been in labour for about forty-eight hours. The first stage of labour had been terminated about thirteen hours before I saw her; and the head had remained at the brim of the pelvis, without advancing in any degree farther down, for upwards of ten hours. On examining, I found the vagina fully relaxed, but its mucous membrane was becoming heated and œdematous, in consequence, in all probability, of the lengthened obstruction of the brim above. The infant's head was elongated, down into the cavity of the pelvis; but the broad part of the head had not passed the brim. The promontory of the sacrum was so easily reached by the finger, as at once to give the idea that it projected forwards to an extent greater than natural. The direction of the sagittal suture showed that the head lay more transversely than in the usual normal presentation. The face of the infant was directed to the right sacro-iliac synchondrosis, or rather to the right ilium. The patient was put fully under the influence of chloroform, and the long forceps were easily applied. The blades of the instrument were, as we found after the birth of the child, applied as usual, obliquely over the head, and did not offer to slip in any degree under the traction that was applied. But no amount of traction that I thought it justifiable to employ could move the head downwards; and Mr. Drummond failed also in making any impression upon the advancement of the cranium, when I gave him the instrument to use. I altered, in several ways, the direction of the traction, and the position

of the patient, but still without any success, and at last withdrew the forceps. Conceiving that possibly there might be some obstruction to the advancement and passage of the child, from some malposition of the arm about the neck, or from some malformation, I introduced the hand by the side of the child's head, for the purpose of ascertaining these circumstances, but found nothing that appeared to me capable of explaining the delay, and the impossibility of advancing the head by the forceps, except it were some oblique position of the head, relatively to the neck or trunk of the infant. A few years ago, I should perhaps in such a case have deemed the operation of craniotomy the only remaining resource. But the stethoscope showed that the child was still alive and well. And, under these circumstances, I resolved to attempt to extract it by the operation of turning. The patient was deeply anæsthetised, in order to relax the uterus as much as possible; and, at a time when all uterine contraction seemed absent, I passed up my hand and brought down one of the lower extremities of the child. While doing so, a large loop of the umbilical cord fell down into the vagina. I now found an obstruction to the complete version of the infant, which I had met with previously in other cases of turning, when the head was the originally presenting part. For, though one foot was down at the orifice of the vagina, the version of the fœtus upon its own axis had not been complete, and the head was still at, or near the brim. Consequently, while Mr. Drummond held and retained the extruded foot, I passed up my right hand to the head to push it upwards, so as to complete the version—a part of the operation which, in this as in other cases, is always much aided by the manipulation of the left hand upon the abdomen externally. Subsequently the trunk and arms were easily extracted, and the traction requisite to make the head pass the brim was much less than I had seen in several similar cases. The child after birth had the heart still pulsating, and was readily revived by repeatedly plunging its body alternately from a warm into a cold bath. Yesterday, 21st of January 1852, I saw both the infant, which was, perhaps, rather above the usual size, and the mother quite well.

Case II.—"On the evening of the 2d of December 1851, I was requested," Dr. Weir writes me, "by my pupil Dr. Bone, to give an opinion upon a case of protracted labour. The patient had been eighteen hours in labour of her fifth child. She had been on previous occasions the subject of tedious and difficult labour, except in one confinement, when the child was born below the usual size. Her face was flushed, eyes suffused, skin hot, pulse quick, and restlessness great. The os uteri was completely dilated, and the liquor amnii discharged. The head was still at the brim of the pelvis, and although the pains had been for many hours quick, strong, and expulsive, a very small portion of it penetrated the pelvic cavity, and so much as did, receded above the brim upon the cessation of the uterine contractions. Under these circumstances, I determined to deliver her immediately; and as it appeared a favourable case for turning, decided upon doing so in preference to using the long forceps. The chloroform was administered till deep snoring was produced, and the hand introduced in the usual manner. So completely were the uterine efforts suspended, that I grasped both the feet before the uterus contracted in the slightest degree upon my hand. No difficulty was experienced in extracting the child till the head reached the brim, when considerable force was required to draw it through, but not so much as to prevent its being born alive. The mother did well, and in a few days was attending to her household duties. The child presented after birth a deep depression of the cranium on the anterior part of the left parietal bone, immediately above the ear—the result, no doubt, of compression against the promontory of the sacrum. But this

has not affected the health of the child, which now, 20th January 1852, is otherwise thriving and well."

Case III.—"On the 30th November 1851, I was called," writes Dr. Peddie, "to Mrs. ——, aged 30, in her sixth confinement.

"At her first confinement, November 10, 1843, in consequence of contraction at the brim of the pelvis, principally on account of an exostosis projecting from the promontory of the sacrum, and to some extent also from an under-average size of the pelvis, she was delivered by embryulsio. This extreme measure was not resorted to until forcible natural pains had existed for many hours, without effecting an entrance for the head at the brim of the pelvis; until the long forceps had been applied, first by myself, and then by Dr. Simpson, without obtaining any advance of the head; and until the fœtal circulation had been ascertained to have ceased. After the perforation was employed, no small difficulty was experienced in dragging the child through the pelvis.

"At her second confinement, 26th September 1844, after allowing four hours to elapse from the time when the os uteri was fully dilated without the smallest descent of the head, I succeeded, with the long forceps and powerful traction, in delivering the child safely. This fortunate termination was the more satisfactory, that the induction of premature labour had been considered and decided against some months previously.

"At her third confinement, 20th April 1846, the labour went on naturally, and the child was expelled without artificial assistance. The explanation of this fortunate event appeared to be, that the child was a female one, and considerably under the average size, the head more particularly being small.

"At her fourth confinement, 28th October 1847, the labour resembled Mrs. ——'s first, the first stage being short, while the second had existed for many hours before I saw her. The pains were extremely forcible, conveying the impression of danger from rupture of the uterus. After trying two different pairs of long forceps, I sent for Dr. Simpson, who furnished me with a third pair—which, though easily applied and powerful, did not enable me to bring forward the head in the least degree. Dr. Simpson then proposed turning in preference to perforation—the more especially as the child was ascertained to be still alive; and this he accomplished readily, the patient being very deeply under chloroform, and delivered her after the employment of very powerful traction. The child was at first as if still-born, but was brought about after the continued use of the usual means.

"At her fifth confinement, 11th December 1848, the presentation was a footling one—as if nature was indicating the right mode of procedure; and, accordingly, when the first stage was completed, I seized hold of the other foot, brought it down, and delivered the child safely, but not without the employment of very considerable traction in bringing the head through the pelvis.

"At her sixth and last confinement, 30th November 1851, I saw Mrs. —— at eleven A.M. Pains had begun about twelve o'clock on the previous night, and had gone on regularly, but not severely, until within two hours of the time of my visit. I found the os completely dilated, the vagina filled with tensely distended membranes, and the head above the brim. On passing the hand to make a proper examination, I recognised the old exostosis, but decidedly larger, fully the size of a small walnut, projecting from the sacrum immediately within the right sacro-iliac symphysis. I found also that the head was lying with the occiput to the sacrum, pointing somewhat to its left iliac symphysis, and the forehead to the right side of the symphysis pubis. I was also satisfied that the head was of large size, while the pelvis generally was small.

"Considering previous experience in the case of this patient, and the remarkable success of turning in her fourth labour, when she could not have been delivered otherwise than by the life-sacrificing perforator; and considering that in the present labour the peculiar position of the head would render efforts by the long forceps—however well employed—useless, I resolved at once to turn. This I accomplished, and brought down the body very satisfactorily, while the patient was placed deeply under chloroform by Dr. Harper of Leith, who kindly assisted me. As was to be expected, much exertion and pulling were necessary to drag the head through the pelvis, although the most favourable respective diameters were chosen. A towel slipt round the anterior part of the neck and chest, and crossed over the shoulders behind, gave steady purchase, and enabled me more readily to complete the delivery. The child was a large boy, and at first apparently still-born; but in about twenty minutes, after unceasing attention, by giving alternate plunges in hot and cold baths, as practised in the first and second labours, and by the use of artificial respiration, he was completely restored. He ultimately did well, and Mrs. —— made an excellent recovery. The child weighed 9 lbs. 5 oz."

In conclusion, let me briefly recapitulate some of the principal advantages which, as it appears to me, the operation of turning has over the operation of craniotomy, in cases such as we have been considering in the present communication—viz. where the pelvis is somewhat too small, or the fœtal head somewhat too large, to allow the infant to pass by the unaided efforts of nature, or even with the assistance of the long forceps, if that instrument is had recourse to.

1. It substitutes the delivery of the infant by the hand of the accoucheur, for its delivery by formidable steel instruments. And, certainly, the avoidance of instruments is, as a general principle, desirable when it is possible.

2. The transit of the cone-shaped head of the child through a somewhat narrow brim is facilitated by the narrow end of the cone (or bi-mastoid diameter of the head) being made to enter and engage first in the contracted brim; and the hold which we obtain of the extruded body of the child enables us to employ so much extractive force upon the engaged fœtal head, as to make the elastic sides of the upper and broader portion of the cone (or bi-parietal diameter of the cranium) to become compressed, and if necessary indented, between the sides of the contracted brim.

3. When the child is brought down footling, we have far more power than when the spherical arch of the cranium presents, of manually adapting and adjusting, when necessary, the shape of the head to the shape of the contracted brim; the rounded form of the cranium not affording us any sufficient hold and purchase for this purpose in cranial presentations.

4. The *lateral* and very *temporary* compression of the fœtal head by the contracted sides of the pelvis, such as we can produce and effect on artificial turning and contraction, is less dangerous to the life of the child than its *oblique* or longitudinal compression with the long forceps, or by the *long* impaction of the head itself in the contracted brim.

5. In cases where the narrowness is greater, and such as to produce a depression or indentation in the elastic and flexible cranium of the child, still this transient depression, or indentation, is not necessarily destructive to life, as the perforation of the head in craniotomy is. Children often survive and recover, when born with the head much distorted and even indented. See, for example, the child in Case II., and other similar instances recorded by Smellie, Denman, Velpeau, Dugès, Jacquemier, Radford, etc. etc.

6. On these accounts, the operation of turning affords a fair chance of life to the child, while craniotomy affords none. And even when the turning and extraction require some considerable time for their performance, the resulting temporary asphyxia of the child is not necessarily so deep and fatal but that the infant may be revived by appropriate measures applied after birth. I can, for one, state that in these cases, and in instances of common footling and turning cases, I have repeatedly been astonished at the viability of the infant after traction had been applied to it, both so strong in degree and so long in duration as to leave apparently little hope of its survival; and I have heard other practitioners make the same remark as the result of their experience.

7. The operation of turning, under the circumstances we speak of, will, I believe, be found also to be more safe to the life of the mother than the operation of craniotomy. In every instance the operation of craniotomy is necessarily fatal to the infant; but in a very large proportion also, this operation is fatal to the mother. The statistical results collected by Dr. Churchill and others show that craniotomy is fatal to the mother in about 1 in every 5 cases in which it is performed; while turning does not generally prove fatal in above 1 in every 15 or 16 patients, even including complicated cases.[1] Besides, it affords this great source of safety to the

[1] Out of 303 craniotomy operations, 60 of the mothers died, or 1 in 5.—Churchill's *Midwifery*, p. 314. Out of 192 cases of turning, 12 mothers died, or 1 in 16.—*Ibid.* p. 250. "Between," says Dr. Ramsbotham, "the years 1823 and 1834, I delivered more than 120 women under transverse presentations, independ-

mother, that, *cæteris paribus*, delivery by turning can be, and is, as a general rule, adopted far earlier in the labour than delivery by craniotomy; and in proportion as it is practised earlier, so far also will it be practised with greater safety and greater success—the maternal mortality attendant upon parturition, whether natural or operative, increasing always in a ratio progressive with the increased duration of the labour.

Among the operative deliveries which occurred in the Dublin Hospital when Dr. Collins was master of the institution, the duration of the labours at the time of operating is stated in 125 cases. Among these 125 instrumental and operative deliveries, only 1 in every 17 of the mothers was lost, when the delivery was accomplished within twenty-four hours from the commencement of labour; 1 in every 7 of the mothers died when the delivery was delayed till from twenty-four to forty-eight hours; and nearly 1 in every 2 mothers perished when the delivery was delayed till the labour had gone on above forty-eight hours. Obstetricians have often argued, that if, in cases of obstructed labour, the delivery is delayed for a sufficient length of time, the child will be ultimately destroyed by the uterine action and compression, and that thus craniotomy will be at last performed upon the dead infant—the child being killed by an act of omission, and not of commission. But even such very protracted delay is not always fatal to the infant—some continuing to survive when the labour is prolonged for sixty, or seventy, or more hours.[1] And it is always to be remembered, that the delay

ently of a few cases to which I was summoned, where spontaneous evolution occurred. Many of these cases presented a formidable appearance; for in one the membranes had been ruptured a whole week; in another, 69 hours; in a third, 58 hours; in another, 55; in another, 53; and in many, more than 48; and, as a general principle, we presume, that the longer the liquor amnii has been evacuated, the more likely is the uterus to have embraced the fœtal body firmly, and the more difficulty will there be in overcoming the resistance. In none of these cases did I exhibit large doses of opium, and in those few where bleeding was practised, that operation was had recourse to, not for the purpose of relaxing the rigidity of the uterine fibres, but to relieve the inflammation which the soft structures were suffering, and to remove tumefaction. In not one of these instances was any injury inflicted on the uterine structure by the hand, nor did any permanent evil arise that could be attributed to the operation. In four cases only was the uterus so powerfully contracted as to refuse admittance to the hand, and compel me to adopt the alternative of evisecrating or decapitating the fœtus."—*Obstetric Medicine and Surgery*, p. 362.

[1] Out of 27 cases reported by Dr. Collins, in which labour was prolonged to 60 hours and upwards, in 16 the child was born dead; and in 11 it was still alive at birth. Of the 27 mothers, 1 in 4 died.

itself, if dangerous to the life of the child, is also, as the above and other evidence shows, almost equally dangerous to the life of the mother. In such cases of long obstruction and delay, even after the head is perforated by craniotomy, much traction is often required to drag the shoulders through the contracted brim, and that at a time when the structures at the brim are so damaged by previous pressure as to be little able to bear compression with safety. And I do think that we have most ample grounds for believing, that the *long* compression of the soft parts, such as occurs in very protracted labour, is more truly dangerous to the structures than a *short* compression of them, greater in amount, such as occurs in the operation of turning when early performed.

In not a few cases, in which the operation of turning is resorted to in consequence of the complication which we have been considering, the practitioner must be prepared to meet with such resistance to the passage of the head through the brim as will require some adjustment and considerable physical exertion on his part in order to overcome it. But if the head be so adjusted in the brim, that the shape of the one is, as much as possible, adapted to the shape of the other; if the chin be kept depressed towards the sternum; and if the traction applied be made in the proper axis of the brim itself, no small amount of extractive force may be used without compromising the safety of the mother or infant. The degree of traction which the structures of the infant's neck will, in this way, undergo, is much greater than one would *a priori* suppose. And, as a very general rule, the elastic lateral walls of the cranium of the child will become compressed or indented, before any dangerous injury is inflicted upon the structures of the neck. But on this subject I most willingly substitute, for any remarks of my own, two or three sentences from the work of an author—always practical and always cautious—Dr. Denman, who, in speaking of the occasional difficulty of extracting the head in common pelvic and turning cases when the brim is somewhat contracted, gives, among others, the following directions :—

"The force with which we endeavour to bring down the head of the child must then be gradually increased, till we are convinced that a greater degree is inconsistent with the safety of the child, or induces the hazard of separating the body from the head. Should the head descend in ever so small a degree, we must not act precipitately, and increase the force in order to finish the delivery

suddenly; but we must proceed with circumspection, or we shall add to the danger which the child is already in, and run the risk of doing injury to the mother; though, when the head begins to advance, there is seldom much remaining difficulty, the cause usually existing at one particular part of the pelvis. It has been said that children have sometimes been born alive, when the strongest efforts, and these continued for many hours, have been made to extract the head detained in this position. But I have not been so fortunate as to meet with any such instances, a short space of time having generally been sufficient to frustrate my hopes, and convince me that the child was dead. Though, when the head has been detained a considerable time, a few cases have terminated more favourably than I could have expected, and I have been agreeably surprised with the discovery of some faint signs of life, which, by the assiduous and careful use of the common means, have been improved, and the life of the child at length perfectly recovered. * * * When we have in vain exerted all the force which we think reasonable and proper, and which, in some cases, must be more than any circumstance would be thought to require, it will be expedient to rest, for the purpose of gaining all the advantage to be gained by the compression of the head. On this account the mother will actually suffer no more inconvenience than would have been purchased if the head had originally presented, and been locked in the pelvis. After waiting some time, we must renew our attempts to extract, and thus proceed, alternately resting and acting with efficacy and resolution, and if the hold we may have of the body or extremities of the child does not suit, a silk handkerchief or other band may be passed round its neck, and this will be found a very handy and convenient instrument. It must," Dr. Denman adds, "be a very great disproportion between the head of the child and the pelvis, which is able to withstand this method of proceeding, if we persevere in it with prudence and steadiness; because the integuments of the head will burst, or the bones be bent inwards in an extraordinary degree, or even broken. * * * If it fail, it then only remains that we should lessen the head of the child; and the operation may be as easily performed in this as in the natural presentation of the head. When," he continues, "the perforation is made, and the brain evacuated, the head may be readily extracted either by pulling by the body of the child or by inserting a crotchet in the opening made by the operator as in other cases. But it will be scarcely believed how seldom this operation is necessary under these circum-

stances, if we have not been in a hurry, but have acted with prudence. Nor," concludes Dr. Denman, "have I ever known any ill consequences follow the compression which the soft parts undergo between the head of the child and the sides of the pelvis, if proper attention were afterwards paid to the state of the bladder and rectum."[1]

VAGINAL HYSTEROTOMY, ETC., IN LABOURS OBSTRUCTED BY UTERINE AND VAGINAL CANCER.[2]

Carcinoma in the walls of the cervix uteri and vagina is occasionally found co-existing with pregnancy and parturition. Such deplorable cases have been seen to terminate variously. Sometimes the cervix has been still found so very slightly diseased and indurated, at the time when labour at last supervened, that it has spontaneously relaxed and opened for the transit of the child. Far more frequently its unyielding structures have fissured and torn under the pressure of the presenting part of the infant; the labour, however, thus terminating ultimately without artificial aid, after sufficient space was obtained by the spontaneous lacerations. In some instances the patient has, some days after labour supervened, died undelivered, in consequence either of pure exhaustion, or of laceration of the walls of the body and fundus of the uterus. And in one or two rare cases, the pains of parturition, after coming on regularly at the full term of pregnancy, have after a time ceased—and as in the "missed labours," that so often happen in the cow and sheep—the dead fœtus has been retained in utero for weeks, or even months, beyond the normal period of delivery.[3]

Case I.—In a patient pregnant, and with extensive cancer of the cervix uteri, whom I saw at Hamilton, efforts at labour seemed to come on more than once, when and after the mother herself calculated the term of utero-gestation to be complete. She died at last undelivered, apparently of peritonitis. The fœtus was found decomposing in utero. There was an extensive effusion of lymph on the peritoneal surface of the uterus; but apparently no rupture. She refused to submit to any treatment.[4]

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[1] *Introduction to the Practice of Midwifery*, p. 495, etc.

[2] See Proceedings of Edinburgh Obstetric Society, February 10, 1847, in *Edinburgh Monthly Journal of Medical Science*, April 1847, p. 796.

[3] In a most interesting case described by Dr. Menzies, in the *Glasgow Journal* for July 1843, p. 229, gestation seemed in this way prolonged to the 17th month.

[4] For more details of the case, see a communication by Dr. Miller in the *London and Edinburgh Monthly Journal of Medical Science* for 1844, p. 279.

What *treatment* should we pursue in cases of parturition morbidly delayed and obstructed by cancerous disease of the cervix uteri or vagina? It has been long laid down as a principle in British Midwifery, that when in labour it is found impossible, from the amount of obstruction which exists, that the lives of both the mother and child can be preserved—the life of the infant should be sacrificed by craniotomy, for the safety of the mother, provided there is space to extract the mutilated child through the maternal passages. In accordance with this principle, I have known the mother, in a case of labour obstructed by carcinoma uteri, delivered by the perforation and breaking down of the head of the infant; and cases of delivery by craniotomy, under the same complication, have been recorded by Denman, Dorrington, and others.

But surely we have a true and important exception to this principle when parturition is rendered difficult or impossible by cancer of the cervix uteri or vagina. In consequence of the fatal disease under which the mother is suffering, her own life is not worth more than a few weeks', or at most a few months', purchase; while the child, if saved and not sacrificed, may possibly grow up and become a useful and important member of society. Under such circumstances, we are assuredly justified in preserving the life of the child, even were it at the expense of some additional immediate risk to the life of the mother. When, however, in this complication, the unassisted efforts of nature prove insufficient, and operative measures come to be really required, those that are best, are, I believe, of a kind that usually do not add to the danger of the mother, while they are calculated to preserve the child. In most cases the cancerous part at last spontaneously fissures and lacerates in order to allow the child to pass. By practising vaginal hysterotomy in these same instances, we arrive at the same end; but more certainly and safely. For, instead of allowing the muscular contractions of the uterus to make, by long and exhausting efforts, the necessary lacerations, and gain for us the necessary space, we make these lacerations or incisions with the bistoury; and further, when we do so, we can select the safest time for effecting them—namely, early, and before exhaustion sets in; and we can select also the safest locality for the division of the tissues of the cervix, instead of leaving this entirely to chance. After the incisions are made, the expulsion of the child may be left to nature, or it may be extracted artificially by turning or the long forceps. In the two following cases the long forceps were used after the necessary incisions were made.

Case II.—In a woman in the Royal Infirmary, six months pregnant, the septum between the rectum and vagina was already perforated by carcinomatous ulceration. She went on to the full time. As the disease did not extend to the uterus, but affected only the vagina and surrounding textures, the first stage of labour was completed naturally; the child was then extracted by the forceps. But it was necessary, first, to incise freely the carcinomatous mass obstructing the vagina; and, in bringing down the head, the perineum, which was quite indurated and tuberculated, tore in its whole extent. The infant was alive and healthy. The woman had a rapid convalescence, and lived for more than two years afterwards: the carcinomatous ulceration gradually excavating and destroying almost the whole contents of the pelvis.

Case III.—A patient, the subject of extensive cancerous disease of the cervix uteri, was seized in the Infirmary with premature labour near the eighth month. After the parturient efforts had lasted for a considerable time, without any prospect of successful dilatation and delivery, I enlarged the os uteri by lateral incisions, and extracted the infant with the long forceps. The child survived. The mother suffered no special aggravation of her symptoms in consequence of delivery. The cancerous disease proceeded on its usual course, and proved fatal a few months subsequently.

In the following instance the uterine efforts very speedily expelled the child, after the obstruction from the indurated cervix was removed by incision.

Case IV.—I saw this patient with my esteemed friend Dr. Martin Barry, when he was attached to the Maternity Hospital. The woman had been ill for three days. She was very much exhausted, and her pulse extremely rapid. The cervix was indurated by carcinomatous degeneration at one side, and did not seem at all inclined to yield. Two or three small incisions were made through the indurated portion. This allowed the head to pass, and the delivery was completed after five pains. It was too late, however, to save the patient. Her pulse never fell, and she sank in two or three days afterwards.

The cancerous disease at the time of labour supervening may be found not so great or extensive as to prevent the os uteri opening to nearly its full extent, and yet it may prevent the head from entering the brim. In the following case I delivered the patient by turning, instead of the long forceps—the head being detained so very high up, as to suggest the former as preferable to the latter mode of delivery.

Case V.—A patient, under the care of Dr. Burns, who had previously borne a large family easily, had her last labour very protracted, in consequence of carcinomatous induration of the posterior lip of the uterus. Symptoms demanding artificial delivery supervened by the time the os uteri was nearly dilated. The child was extracted by turning, and survived. The diseased cervix tore slightly as the head passed; and perhaps it would have been better to have determined the seat of this lacration by a previous incision. The cancerous disease proceeded slowly onwards, and she died in about a year.

Case VI.—In another patient of Dr. Burns', premature labour came on spontaneously between the seventh and eighth month; and though the whole circle of the cervix uteri seemed affected with the cancerous disease, the os at last dilated and fissured sufficiently to allow a living child to pass. The disease proved fatal to the mother a few months subsequently.

In cancer complicating pregnancy, the preservation of the life of the child is, we have ventured to state, the great object which the practitioner should desire to effect—especially if he can accomplish this object by means not directly detrimental to the mother—and such cases as this last have suggested the propriety of sometimes attempting to attain this double end by the artificial induction of premature labour. This mode of delivery ought probably to be adopted, if the disease is so severe or acute as to threaten to destroy the life of the mother before the full completion of pregnancy; or if we fear that the mechanical obstruction, from the rapid growth and development of the disease, is likely to prove too great for the possible passage or extraction of a child allowed to reach the full term. At the same time, as our calculations are specially directed to the preservation of the child, it would be wrong to peril its life by bringing it with any unnecessary prematurity into the world; and certainly the idea suggested by one or two authorities, of treating this complication by inducing artificial abortion or premature labour, before the infant was viable, seems to us a practice indefensible either on moral or professional grounds.

In almost all the known and recorded instances of cancer uteri complicating parturition, the obstruction to delivery has arisen far more from the *induration*, and consequent non-dilatability of the structures that were the seat of the disease, than from their increased physical *volume* or bulk. And hence the reason why we may hope to overcome the difficulty, in a great majority of cases, by the division, when necessary, of the affected tissues. But where, unfortunately, in the exceptional case, there exists, from the mere size of the carcinomatous deposit, such obstruction of the maternal passages as to prevent delivery entirely, *per vias naturales*, unless the child be destroyed and mutilated, then it does certainly appear justifiable to extract the infant, if it is still alive, by the Cæsarean section. In this complication of labour obstructed by carcinoma uteri, craniotomy, when adopted, besides proving of necessity directly fatal to the child, has almost always resulted also in the very speedy death of the mother. Few or none in the instances recorded have survived above a few hours, or a few days at most. The Cæsarean section

offers every possible chance of preservation to the life of the child, and is scarcely more rapidly fatal to the mother. Some years ago, my friend Dr. Oldham published a case of large carcinoma uteri obstructing labour, in which the child was saved by this mode of delivery, and the mother did not die in consequence of the operation, as has happened in most instances in which the Cæsarean section has been performed in British practice.

SPONDYLOTOMY IN CROSS-BIRTHS.[1]

Dr. Simpson remarked, that the two oldest operations in such cases were mentioned by Celsus—namely, cutting through the neck, and evisceration. He mentioned a case which he had seen with Bailie Alexander, where he thought he could turn, in which the side was presenting. In the course of a few minutes the position of the child was changed, and the case terminated by spontaneous evolution. Observe, you cannot bend the spine laterally, but you can bend the back forwards. Dr. Simpson spoke of the advantages of spondylotomy, where, with the aid of a strong pair of scissors, with one blade probe-pointed, the back could be divided in cases where turning could not be effected. In Dr. Inglis' case the condition of the uterus could not be called "spasm," but rather what the French call "tetanus," or continued spasm. Dr. Simpson mentioned a case of a woman in labour of her seventh child, where the cervix uteri contracted round the child's neck: the forceps were tried in the ordinary way and failed; but by taking advantage of the relaxation of the uterus during the intervals between the pains, and making traction during those intervals only, he had managed to pull down the head. Dr. Simpson promised to narrate the particulars of a case of arm presentation, with deformed pelvis, at next meeting, where he had performed the Cæsarean section. In arm presentations, where turning proves impossible, Cæsarean section is almost the only treatment, except spondylotomy, which is a mere clipping of the spine at the nearest presenting part, but it must be clipped quite through. Dr. Lee has mentioned that evisceration takes two hours to perform.

[1] See Proceedings of Edinburgh Obstetrical Society, November 29, 1865, in *Edinburgh Medical Journal*, February 1866, p. 770. Sir James Simpson had previously effected speedy delivery, without eviscerating, by what he termed "spondylotomy" (σπόνδυλος a vertebra), in two cases of cross-birth in which he could neither turn nor decapitate. J. W. B.

PART V.

THE PUERPERAL STATE.

DOES AIR EVER BECOME INTRODUCED INTO THE VENOUS SYSTEM THROUGH THE UTERINE SINUSES AFTER DELIVERY?[1]

A SERIES of cases that Dr. Simpson saw, in consultation, and that occurred in rapid succession, six or eight years ago, seemed to him to suggest the idea whether air might not become introduced into the venous circulation of the mother after delivery, and whether one common result of this accident was not the occurrence of a red or scarlatinoid eruption upon the cutaneous surface of the patient.

The first case occurred in the Lying-in Hospital. The patient had been delivered of twins. Dr. Ziegler was called to visit her, in consequence of some difficulty connected with the birth of the second child. Considerable post-partum hemorrhage, with alternate contractions and relaxations of the uterus, supervened, and she seemed to rally very imperfectly from the effects of the flooding. In consequence of this, Dr. S. saw her an hour or two subsequently. The pulse at that time was very rapid and weak, almost imperceptible. The countenance extremely anxious, and here and there was an evanescent red scarlatinoid rash over the body. The patient died in a few hours. The body was opened a short time after death, because it was considered desirable not to incur the fallacy of air being present from decomposition; and Drs. Simpson and Ziegler were anxious to ascertain if the anomalous symptoms that were present during life could possibly arise from the entrance of air into the veins. To make the examination the more certain, the abdomen was opened under water. The lower vena cava, but especially the uterine and hypogastric veins, were distended with frothy blood,

[1] See proceedings of Edinburgh Obstetric Society, January 10, 1849, in *Edinburgh Monthly Journal of Medical Science*, April 1849, p. 707.

and air bubbled up through the water when any of these tubes were opened. The larger veins in the extremities were in the same state.

Some search was subsequently made into the literature of cases in which air had been introduced into the veins during surgical operations upon the neck, etc., in order to ascertain if the evanescent patches of red or scarlatinoid rash remarked in the preceding instance, had been observed in any of these surgical cases. Dr. Warren of Boston, in an article on the subject in the American *Cyclopædia of Practical Medicine*, relates two cases which occurred in his own surgical practice. The first patient recovered after being insensible for a considerable time. While still comatose, "the leaden colour in the cheeks," says Dr. Warren, "assumed a *reddish* tinge, and the alarming character of the symptoms was evidently diminished." The second case was fatal. During the period elapsing between the entrance of the air, and the death of the patient, Dr. Warren, in describing the symptoms, remarks, "The livid colour of the cheeks gave place to a suffusion of *vermilion red*, and no glow in the cheek of a youthful beauty ever gave one so much pleasure as that flush. But the flush soon passed off."

If the red or scarlatinoid rash which appeared in the preceding obstetric case upon the surface of the skin were owing to the entrance of air into the uterine veins, might the symptom be accounted for on the idea, that the introduced air directly mixed with, and oxygenated, the blood in the capillary vessels?

After the preceding case occurred, Dr. Simpson was called to three or four other instances in which a similar train of symptoms was present—namely, great depression after delivery, a rapid and almost imperceptible pulse, and patches of an erratic scarlatinoid rash upon the surface. All the patients died within two or three days after delivery. In one case, which he saw with Mr. Kerr, and where the death was much more rapid, no red rash appeared, although the other symptoms were analogous. The first was the only case in which an autopsy was procured. Two or three of the cases had been considered as malignant scarlatina, a disease which was acknowledged by all our highest obstetric authorities to be exceedingly fatal to the puerperal female, but which may possibly in many other cases have been mistaken for, and confounded with, the affection to which this notice refers.

Supposing the introduction of air into the venous system after delivery to be the cause of the symptoms or affection in question, it is not perhaps difficult to understand the mere mechanism of its introduction. Surgical pathologists generally hold that the air,

cannot be *drawn* into open veins, unless these veins are not very distant from the heart. But air may perhaps be *forced* into open veins when the open orifices are at a distance from the heart, and when circumstances exist capable of causing it to enter into such orifices.

A mechanism calculated to produce the entrance of air in this last way exists in the uterus after delivery. The interior surface of the organ, especially opposite the late seat of the placenta, has a number of ruptured venous orifices opening upon it. Supposing air once introduced into the uterine cavity, which in some cases may occur in consequence of the alternate relaxations and contractions of the walls of the organ following delivery (as in after-pains, post-partum hemorrhage, etc.); and supposing, further, that under the returning contractions of the organ, the expulsion of this air from the cavity was prevented by the presence of a clot at the os uteri, or other such obstructing cause, it will then, under the compression to which it is subjected, be liable to be driven into the open venous orifices existing in the lining membrane of the uterus. A bottle of caoutchouc of the shape of the uterus, and with tubes like the venous tubes of the uterus opening upon its interior, would act in this way on the principle of the force-pump, in sending any air sucked or drawn up into its cavity along these open tubes, if, after being full, its parietes were compressed, and the aerial contents prevented from escaping through its mouth, as we fancied to be the case in the uterus under the conditions mentioned.

ON THE COMMUNICABILITY AND PROPAGATION OF PUERPERAL FEVER.[1]

Dr. Arneth of Vienna having read a paper on the cause of the puerperal fever at the Lying-in-Hospital of Vienna, and Dr. Moir having related the history of some cases which had lately occurred in his practice, Dr. Simpson expressed a similar opinion of this last series of cases, to what Dr. Moir himself had given—viz. that the original focus of contagion in them was to be traced to the diseased blood and tissues of the mother who was first delivered and first attacked—that her blood had affected the infant which she carried within her—and that probably the vaginal secretions and discharges from this said patient during labour had unhappily formed the

[1] See Proceedings of Medico-Chirurgical Society of Edinburgh, April 16, 1851, in *Edinburgh Monthly Journal of Medical Science*, July 1851, p. 72.

virus or material which had been unwittingly carried by Dr. Moir, so as to affect his other patients.[1] It was only by careful and searching analysis of cases of puerperal fever, like Dr. Moir's, when they did occur, that we could hope ultimately to arrive at a knowledge of all the various ways and means in which the disease may originate or be spread, and consequently of all the different means which may be adopted to prevent its spreading. Dr. Hill of Leuchars has described one instance which was interesting in this respect, that, as in Dr. Moir's, both the mother and the child seemed affected before delivery. A carpenter had his hand wounded and poisoned by the discharge issuing from a dead body, whilst placing the corpse in the coffin. A severe attack of erysipelas followed. Subsequently his wife had a similar attack of erysipelas. Their daughter living with them, and in the seventh month of pregnancy, was then taken with an attack of fever. In a day or two she gave birth to a dead child, whose body had all the appearance of being affected with erysipelas, as the arms of the mother's parents previously were. The mother herself died within twenty-four hours, with the symptoms of malignant puerperal fever. On his road home from visiting this patient, Dr. Hill was called to a case of labour, and this other was also attacked with puerperal fever. Dr. Arneth's very valuable paper adduced what was apparently incontrovertible evidence of puerperal fever being propagated in the way he suggested—viz. by medical men carrying on their fingers matter capable of producing it from bodies which they were dissecting, and inadvertently inoculating that matter into the mucous membrane of the vagina of patients in labour. In these cases, the fingers of the accoucheur, when once dipped in the poison, might retain it till they had again inoculated that poison into the bodies of other healthy subjects. The vaginal mucous membrane was generally stretched and abraded in labour; the perineum was often slightly torn; and the whole afforded a surface in a condition easily inoculable. But if students and practitioners, with their hands containing some portion of morbid matter, can thus, by inoculating that matter on the abraded surface of the vagina, produce puerperal fever, no doubt, under similar circumstances, surgeons could and did inoculate into the wounds which they made or dressed, similar matter producing the similar disease of surgical fever in their patients. If it could be inoculated into the abraded surface of

[1] For details of Dr. Moir's cases, by himself, see *Edin. Monthly Journal*, July 1851.

the vagina, it could be inoculated into a recent wound. If it produced fever in the one set of patients, it would produce fever in the other. And since bringing under the attention of the profession the communicability of surgical fever, Dr. Simpson stated, that he had heard various facts in regard to it, all of which more and more convinced him that surgeons, like accoucheurs, were occasionally the unhappy media of inoculating their patients with morbid matter, producing in them surgical fever, as in puerperal patients, obstetricians, by the same means, produced in their patients puerperal fever. He had no doubt that it would take many long years fully to convince surgeons of this fact; but still it was his conviction, that surgeons would ultimately both believe and act upon it, and that their doing so would be a means of preventing many of the numerous deaths which now occur after operations, particularly in hospital surgical practice.

Continental accoucheurs generally did not understand exactly the kind or description of evidence upon which British practitioners founded their belief in the contagious communicability of puerperal fever. Some of the Continental writers on this subject seem to imagine that British obstetricians believe that puerperal fever was usually propagated directly from one patient to another; and not seeing this occur, when a puerperal fever patient, in their Continental hospitals, lay by the side of another and healthy woman, they imagine that from this fact they had a disproof of the opinion of the contagious communicability of the disease.

But in this country we do not believe that the disease is usually propagated in this way, directly from individual to individual, but indirectly, through the medium of a third person; and that person generally the medical attendant or nurse. But that it was so propagated by the medical attendant or nurse, we further believe upon the following species of evidence—viz. that it was, as in Dr. Moir's late cases, and in most other instances, distinctly and precisely limited to the practice of one or two practitioners only, out of a large number of medical practitioners, practising in a large community. Many examples were recorded, and many more unrecorded were known to the profession, of the disease being thus limited to the practice of a single practitioner in a town or city; all, or almost all, the patients of that practitioner being affected with it, where none of the patients of other practitioners were seized with any attack of the disease. In these cases we could not believe it to be owing to any morbific influence present in the air, or emanating from

the locality in these cities or towns. For if so, it would affect indiscriminately the patients of all practitioners. But it had been often seen, as it was just now remarked, to haunt the steps of a single practitioner, and a single practitioner only, in a community. Many instances of this were known and published. One would suffice for illustration. Dr. Roberton, of Manchester, tells us, that in 1840 upwards of 400 women were delivered by different midwives in connection with the Lying-in Hospital in Manchester. These 400 women were delivered in different parts of the town at their own houses: 16 of them died of puerperal fever; all the others made good recoveries. The production of this could not have arisen from any general epidemic, or atmospheric or telluric influence; for the fatal cases occurred in no one particular district, but were scattered through different parts of the town. Now, these 400 women and more were attended in their confinements by twelve different midwives. Eleven of these twelve midwives had no puerperal fever amongst their patients. The sixteen fatal cases had occurred in the practice of one only of the twelve. The disease, in fact, was limited entirely to her patients. There must have been something, then, connected with that one midwife, in which she differed from the other midwives, inasmuch as all her patients took the disease, whilst the patients of all the other midwives escaped from it. And in medical philosophy we cannot fancy that this something consisted of aught else than some form of that morbific principle or virus to which pathologists give the name of contagion.

Further, that the disease is really, in such instances, propagated by this third person (the physician or the nurse) carrying to the parturient patients a virus capable of producing the disease, is shown by this kind of additional evidence:—That when the disease has broken out in the practice of one accoucheur, it will spread to the practice of others of his obstetrical brethren, provided they put themselves in a condition to carry the contagious virus from the patients of the first practitioner. In 1836 or 1837, Mr. Sidey of this city had a rapid succession of five or six fatal cases of puerperal fever in his practice, at a time when the disease was not known to exist in the practice of any other practitioners in this locality. Dr. Simpson, who had then no full and proper belief in the contagious propagation of puerperal fever, attended the dissection of two of Dr. Sidey's patients, and freely handled the diseased parts. The next four cases of midwifery which Dr. Simpson attended were all affected with puerperal fever, and it was the first time that he had seen it

in practice. Dr. Paterson of Leith examined the ovaries, etc., from these cases in Dr. S.'s lodgings, as he was at the time collecting facts for valuable papers on Corpora Lutea. The three next cases which Dr. Paterson attended in that town were attacked with the disease. It was upon evidence of this kind that British pathologists generally rested in founding their belief on the contagious communicability of puerperal fever.

And it was evidence of this kind which had intuitively driven them to adopt those means of prevention or avoidance, which are so highly necessary, in order to arrest the propagation of this fearful malady. The measures proposed and so successfully adopted by Dr. Semelweiss in the Vienna Hospital, were beautiful from their mere simplicity; but they were full also of a great lesson to us all. They proved, in a manner beyond all dispute, the great importance of carefully ridding the fingers from all matters in the least degree likely to prove hurtful if inoculated into the vagina of a puerperal patient. And no doubt, as Dr. Arneth had remarked, such matters were always present in the fingers as long as, despite even of common ablutions, they emitted a disagreeable animal odour, the presence of that odour being a perfect proof of the presence of morbid matter capable of producing the odour. Drs. Semelweiss and Arneth recommended, for the purpose of ridding the fingers of this morbific matter, the use of chloride of lime. Dr. Simpson had used for the same object for years daily (or rather, generally often during the day), a solution of cyanide of potass, which was more effective even than chloride of lime, and had this other advantage, that it removed readily and at once all such stains as the fingers of the accoucheur were apt to receive in treating uterine diseases—with nitrate of silver, iodine, and the like.

Dr. Semelweiss believed that animal matter, in a state of *putrefaction*, was the material which constituted the inoculable virus capable of being transmitted to puerperal patients, and of producing puerperal fever in these patients. Dr. Simpson had strong doubts as to the idea of this matter being necessarily putrid being correct. We see cases in which animal substances are allowed to putrefy within the vagina, and to be applied to the mucous membrane of that canal, without producing puerperal fever. When a polypus, for example, was ligatured and left in the vagina, it often was killed and putrefied there for days before the stalk was completely cut through by the applied ligature. And yet in these cases the patient had little or no liability to attacks of disease like puerperal fever.

Besides, in these cases, the other condition is present, of an abraded surface, as well as putrid matter in contact with that surface, for the vagina was sometimes, no doubt, more or less injured in its mucous surface while passing the ligature; and the ligature itself always made a raw, open, and inoculable surface, as it cut through the pedicle of the tumour. Surgery on other parts of the body admitted of many similar proofs against this doctrine. Dr. Simpson had always believed and taught another theory, but not perhaps a perfectly correct one, in regard to the nature of the contagious material. He believed that generally, if not always, the material which, when carried from one subject to another, could produce puerperal or surgical fever in a newly inoculable subject, was an *inflammatory secretion*, just as the inoculable matter of small-pox, cow-pox, syphilis, etc., was an inflammatory secretion. The case adduced by Dr. Arneth, of puerperal fever breaking out in the hospital apparently in consequence of matter being conveyed from cancer of the uterus to a series of puerperal patients, was not so strong an argument against this view as might at first sight appear. For the cancer patient was, according to Dr. Arneth's own account, several days in labour, the carcinomatous degeneration of the cervix preventing the opening of the os. And there can be very little doubt, that by the end of several days the carcinomatous structures were in a state of inflammation, and probably gangrenous decomposition, from the protraction of parturition. At all events, if the carcinomatous cervix was really putrid, it was in all likelihood putrid from the results of gangrenous inflammation in its compressed and irritated structures. But be this the case or not, it was important to remark, that obstetricians had now very decided proof of various kinds of morbid matters which were capable, when inoculated into the vagina, of leading on to puerperal fever.

For, *first* of all, when the bodies of patients who died of puerperal fever were opened, the inflammatory effusions in the abdomen and elsewhere, when brought in contact with the fingers of the accoucheur, were capable of producing the same disease in other healthy patients upon whom they were accidentally inoculated. In other words, the morbid effusions of puerperal fever in one woman were capable of producing puerperal fever in another woman when inoculated into her system.

But, *secondly*, the same seems to hold true with regard to the secretions coming from the bodies of such patients, even when they did not die and were not dissected. Dr. Simpson alluded to the

cases, for example, of nurses and midwives, whose fingers came into contact with the discharges from the vagina of puerperal patients, giving the disease to other parturient women, and who had not, of course, in the way of post-mortem examinations, been bringing their fingers in contact with the more internal secretions. Dr. Gordon mentions more than one case of this kind in relation to midwives, in his history of the Aberdeen puerperal epidemic.

Thirdly, he believed that the cases recorded by the late Mr. Storrs, Hutchinson, Ingleby, and others, sufficiently proved that the inflammatory secretions in some other inflammatory diseases besides puerperal fever, when carried by the medical attendant, and inoculated into the maternal canals of a parturient female, were sometimes capable of producing in such females true puerperal fever. This seemed more particularly true with regard to the inflammatory effusions in erysipelas and gangrenous inflammation of the limbs, scrotum, vulva, or other part of the body. That the morbid matters thrown out in those more subacute forms of disseminated or phlebitic inflammation which sometimes occur after delivery, were capable of producing puerperal fever when inoculated into puerperal patients, was a fact of some importance to hold in view. And the following recent case will perhaps impress the truth of it. A short time ago, Dr. Simpson was requested to see a case of pelvic abscess in a patient delivered four or five weeks previously. The abscess was artificially evacuated, but only with partial relief; as there were evidently other local inflammations going on, both in the abdomen and chest. The patient died about six or seven weeks after delivery. The practitioner who originally attended her, and who had no puerperal fever cases in his practice, was not able to be present at the dissection. Another able medical practitioner whom he had called to the case after the inflammatory attack had begun, opened the body. Though an excellent and well-informed physician, he rather decried any fear about the possibility of contagion, when Dr. Simpson suggested it to him as he came into the room, and found him opening the body. This gentleman had no puerperal fever cases in his own practice; but within fifty hours after opening this body, he happened to be called to five cases of midwifery. Four of these patients were attacked with puerperal fever, three in a very severe, and one in a mild or abortive form. The fifth patient altogether escaped, the child having been born before the practitioner's arrival.

Fourthly, there were one or two recorded circumstances which

would lead one to the belief that some varieties of febrile exhalations received by inhalation into the blood of a newly-delivered woman, are capable of producing in her a disease analogous to, if not identical with, puerperal fever, the effect being the same as if morbid matter had been introduced into her blood, not by inhalation into the lungs, but by inoculation and imbibition into the vagina, just as in the spreading of small-pox we see the disease liable to be produced in two ways—first, by the direct inoculation of the morbid inflammatory matter contained in pustules on the arm of a healthy individual; or, secondly, by individuals inhaling the morbid effluvia from the bodies of patients labouring under the disease, without its being inoculated into them. Dr. Collins mentions an instance in which a patient was admitted into the Dublin Lying-in Hospital, labouring under a bad form of typhus fever. Two puerperal females, who occupied the adjoining beds, were attacked with puerperal fever and died. In another instance, in the same hospital, a similar accident happened. A patient labouring under typhus fever was admitted into one of the small wards of the house, which contained only some four beds—all the three other women were attacked with puerperal fever, and two of them died. But we had no very decided evidence, so far as Dr. Simpson knew, from hospital observation, that a woman, labouring under puerperal fever, could, by the exhalations from her body, infect with the same disease other patients lying near her in the same ward.

Fifthly, some accoucheurs believe in the possibility of the imbibition of the effluvia from typhus or puerperal fever patients by the clothes of the medical attendant, and that the subsequent inhalation of such matter by the parturient female, might be a means of artificially infecting that female with the disease. Dr. Simpson could not doubt that the saturation of the bed-clothes, etc., with the discharges of a puerperal fever patient, might give the same disease to another puerperal patient who was laid in them. This, and one or two other circumstances, were enough to show that, for safety's sake, it was always well to act upon the possibility of the clothes even of the medical attendant being thus a medium of contagion. In some observations on the subject of the contagion of puerperal fever, Dr. Merriman states, that he once attended the dissection of a puerperal patient, but did not touch the body or any of the parts. The same evening he attended a lady in labour, and she was attacked with the disease. In his account of the Aberdeen fever, Dr. Gordon mentions that a man-servant appeared to carry the

infection of the disease from his sister in Aberdeen to his wife in the parish of Fintray, six miles from Aberdeen. The midwife who attended this woman infected two other parturient patients in the same parish soon afterwards, both of whom died. If a statement of this kind could be established as a fact, by careful analysis of the requisite evidence, it would be a matter of importance, as adding to our knowledge of the modes in which this disease may be propagated. In the instance which Dr. Moir had mentioned, of Dr. Hamilton visiting the patient of another practitioner affected with puerperal fever, and immediately after having several cases in his own practice, it was not at all unlikely that he had made some examination of the patient, or, at all events, without proof that he had not, it would not be proper to conclude that the disease in that instance could be carried by the clothes of the physician acting in the way of *fomites*. The history of the other case adduced by Dr. Moir, of the fever breaking out on ship-board, when bed-clothes had been used which had been employed previously in the beds of women who had died of puerperal fever, would be exceedingly important in the way of proof, if it had been more substantially reported and authenticated. One can scarcely believe that such clothes should be shipped after being thus used, without having been previously thoroughly washed and cleansed. Dr. Simpson had also been informed of an instance by Professor Patterson, in which a medical gentleman, after having lost several cases of puerperal fever, got rid of the disease in his practice by changing his clothes, and using chloride of lime, etc.; but it again returned to him when he happened to deliver a patient immediately after wearing a pair of gloves which he had used during the time of the puerperal epidemic; and certainly, if there was any piece of dress more apt to retain the contagion than another, it was this useless and superfluous appendage to our attire; for it might retain the morbid secretions that were originally on the fingers of the accoucheur, just as our vaccinating glasses would retain the cow-pox matter.

Sixthly, in a small ward or small hospital, one could almost, as it were, manufacture puerperal fever at will, by crowding a great number of puerperal patients together in the same ill-ventilated room. The discharges from the different patients in a few days rendered the air of such a room so loaded and morbific, as to be oppressive to all entering it, and capable of producing febrile action by the inspiration of it, in those puerperal patients who occupied its beds. This, no doubt, was true when this experiment was driven,

as it sometimes accidentally had been, to an extreme. But it was true also in its lesser degree; for Dr. Simpson believed that one great cause of weed, ephemera, and febrile attacks during puerperal convalescence, was the still too slight attention that was paid to the ventilation of the lying-in chamber. He had repeatedly, he thought, seen more or less slight febrile action set up in a patient, from the curtains being closely drawn around her bed for eight or ten hours during the night, being thus obliged to breathe an air loaded and affected with the morbid animal discharges from her own body.

Seventhly, Dr. Arneth had not alluded to the question, Whether the disease was ever caused or not, or a predisposition at least given to it, by epidemic influence? Dr. Simpson believed that we ought not altogether to forget the possibility of epidemic influences acting directly or indirectly in the causation of it. During the present century the disease had nearly, in two or three instances, as in 1819-20 and 1829, prevailed in most of the cities and lying-in hospitals of Europe. And it was difficult or impossible to account for this simultaneous existence everywhere, without believing that everywhere there was some general epidemic cause tending to its production. In this the history of puerperal fever did not differ from the history of other contagious febrile diseases. During the latter part of the last century, for instance, small-pox contagion existed in almost every town and village in England, because in almost every one of them there were artificial causes operating to produce and perpetuate the disease, inoculation being very generally practised. But it was only in particular years, and sometimes at a considerable distance of time, that the disease became epidemic. And when it did so, it was owing to other causes being in action in addition to the mere inoculation. Nay more, in some conditions, as during the blowing of the Harmattan wind, we know that small-pox and cow-pox cannot be propagated even by direct inoculation—facts, showing us the influence of epidemic constitution in effecting a greater or less tendency to the production and spread of particular diseases.

One predisposing cause to attacks of puerperal fever was no doubt the state of the constitution of the patient immediately after delivery. Dr. Collins' cases in the Dublin Hospital showed, not only that the disease was far more apt to attack those who were worn out by long labours, than those women who had escaped with parturitions short in their duration; but also, that the malady, when it did appear, was much more fatal in the former than in the latter

class of patients. The Society was aware that it had been proposed by various pathologists of late years to give various prophylactic medicines to puerperal patients after delivery, and to surgical patients after operations, in order to prevent the attacks of puerperal or surgical fever. All these measures, such as sulphate of quinine, muriate of iron, etc., had the object in view of strengthening the constitution of those to whom they were exhibited, so as to diminish or destroy the predisposition to these feverish attacks. And we could understand their proposed mode of action when we reflected upon the fact, that a predisposition to such attacks was given by any unusual degree of exhaustion or debility in the patient. Every patient exposed to the contagion, and even to the inoculation, of small-pox, for example, did not take small-pox. There were other means by which the predisposition to that disease was reduced or removed, than by previous variolation or previous vaccination. And perhaps, particularly, or otherwise, by medicine, we may be able to reduce or remove the predisposition to puerperal fever, as well as to scarlatina, measles, etc.

Lastly, Dr. Simpson observed, that no doubt sporadic cases of puerperal fever frequently did occur traceable to no contagion or any other cause capable of being averted ; some of them owing, as in Dr. Moir's first case, to morbid actions going on in the constitution of the patient even before delivery ; but oftener owing to morbific agencies—capable, under other circumstances, of producing fever or inflammation—acting upon the patient during or after delivery.

Dr. Arneth had particularly called the attention of the Society to the connection which was generally believed by British accoucheurs to exist between erysipelas and puerperal fever ; and he had stated that the relation between these two diseases had not been observed in Vienna. Dr. Simpson, however, expressed his opinion, that now that Dr. Arneth's attention had been directed to it, he and his compatriots would find such relations existing between these two diseases, as English accoucheurs spoke of. We, all of us, often overlook such facts in pathology till our attention happens to be prominently called to them. Dr. Simpson had long believed and taught that there was a pathological connection between the two diseases in question, as to their pathological nature, their pathological anatomy, their symptomatology, and their causation. The two diseases had in Britain been repeatedly observed to prevail at the same time, in the same town, in the same hospital, or even in

the same wards. There were various accurately recorded instances in our British journals, which he had already alluded to as showing this—that when the fingers of medical men were impregnated with the morbid secretions thrown out in erysipelatous inflammation, the inoculation of these matters into the genital canals of parturient females produced puerperal fever in them in the same way as the inoculation of the secretions from patients who had died of puerperal fever itself. The effused morbid matters in the one disease, as in the other, were capable of producing the same effect when introduced into the vagina of a puerperal patient. In an instance recorded by Mr. Hutchinson, two surgeons, living at ten miles' distance from each other, met half-way to make incisions into a limb affected with erysipelas and sloughing. Both practitioners touched and handled the inflamed and sloughing parts; and the first parturient patients that both practitioners attended within thirty or forty hours afterwards, in their own distant but respective localities, were attacked with, and died of, puerperal fever. The late Mr. Ingleby mentions an instance of a practitioner making incisions into structures affected with erysipelas, and going directly from this patient to a patient in labour. This patient took puerperal fever and died. And within the course of the next ten days, seven cases of puerperal fever occurred in the practice of the same practitioner, almost all of them proving fatal. And various other cases, similar to the preceding, were well known to the profession.

Again, however, the reverse of this was equally true. Not only was the morbid matter in erysipelas apparently sometimes capable of producing puerperal fever, but the secretions and exhalations from puerperal fever patients seemed, on the other hand, sometimes capable of producing erysipelas. In the series of puerperal cases met with by Mr. Sidey in this city about 1837, and which had already been alluded to, the morbific matter carried from two or three patients seemed, as has been previously stated, to produce the disease, both in Dr. Simpson's own practice, and also in the practice of Dr. Paterson. The morbid effusions of these patients created the same disease of puerperal fever in other patients to whom that matter was carried. But the morbid secretions and exhalations from these same patients appeared to do more—viz. they produced also erysipelas in several of the nurses, relations, and attendants upon the patients. Four or five cases of erysipelas followed upon a single one of these puerperal cases in Mr. Sidey's practice, and that during the week subsequent to the puerperal patient's death. The patient's

mother-in-law, who was in constant attendance upon her, was attacked with fever and erysipelas of the face and head. One of the patient's sons, a boy five years of age, was attacked with erysipelas of the face; a daughter was seized with fever and sore throat, with dusky redness, which continued for some time; and the patient's sister-in-law was attacked with acute gastric symptoms, and great abdominal irritation, under which she sank in a few days. Here we have apparently the same focus of contagion producing puerperal fever in puerperal patients, and erysipelas, inflammatory sore throat, etc., in patients who were not in a puerperal state. Dr. Hill of Leuchars had published in the *Monthly Journal* of last year two very important series of cases, showing in a similar way the connection between puerperal fever and erysipelas, in the identity of the poison that was capable of producing these two diseases. We have already seen that the inoculation of the morbid matters from erysipelatous structures into parturient patients will occasionally produce puerperal fever. But furthermore, the converse of this is so far also true—viz. that the inoculation of morbid matters or secretions from puerperal fever patients into other healthy individuals, will occasionally produce in the latter attacks of erysipelas. A considerable number of instances have been published by Dr. Duncan, Mr. Travers, and others, in which medical men have died from punctures received in dissection, or rather from erysipelatous inflammation of the arm and side following such punctures. The history of a large proportion of these cases shows further, that the matter thus inoculated, and which produced the fatal erysipelas and fever, was a puerperal fever secretion; as in most instances the disease resulted to these medical men from opening the bodies of patients who had died of puerperal fever.

Whilst thus arguing for some pathological connection between erysipelas and puerperal fever, Dr. Simpson further stated, that though, in a few cases, patients labouring under puerperal fever had been attacked with erysipelas of the skin and cellular tissues; and, on the other hand, patients who were delivered when suffering under erysipelas, were sometimes subsequently attacked with puerperal fever; yet these results were not always observed. He alluded to cases where erysipelas had attacked women before delivery, but was not followed by puerperal fever. And he had seen more than one patient labouring under puerperal fever have inflammation of the skin, but that of a pustular type, like ecthyma, and not of an erysipelatous character. In stating this, he wished to state his belief

that the diseases were not in all respects pathologically identical, though the morbid secretions in the one were capable of producing, in those predisposed to it, the other disease—erysipelatous effusions producing puerperal fever, and puerperal fever secretions producing erysipelas.

Other febrile and inflammatory products, besides those of puerperal fever, when inhaled through the lungs into the blood, or inoculated into the blood through the vagina, may, as already stated, probably produce puerperal fever, in addition to those we have principally spoken of, viz. the secretions from puerperal fever and erysipelatous patients. And he thought the whole subject one of extreme importance to have more thoroughly investigated; because, in a disease like puerperal fever, it was the means of prevention that we were to look to, and to expect success in, more than the means of cure. It was here, as elsewhere, evident that human life would probably be saved to a far greater extent by studying the means of preventing the causation of disease, than by any study of the means of treatment, after disease was once actually commenced. And when it was remembered that about 3000 women still died in child-birth in England and Wales alone every year, and that a large proportion of these 3000 maternal deaths were deaths from puerperal fever, he thought he need not make any further observations on the importance of studying the means of prevention and prophylaxis in such a fatal and formidable malady, nor offer any apology for the length of the remarks which he had ventured to offer on this important subject.

ERUPTIVE FEVERS IN PUERPERAL PATIENTS.[1]

Professor Simpson said he had been led to bring this subject under the notice of the Society at present, in consequence of having been lately called to see, in consultation, two cases of puerperal scarlatina, which had occurred in the practice of one of the most able and accomplished of our country practitioners.

Case I.—The first patient was a young primipara, who, at a distance from Edinburgh, was confined after a labour of no unusual difficulty, and remained well till the second day after her confinement, when the pulse rose, and she became so delirious that it was thought she was labouring under an attack of puerperal mania. When he (Prof. S.) saw her first on the third day, the delirium had

[1] See Proceedings of Edinburgh Obstetrical Society, January 14, 1863, in *Edinburgh Medical Journal*, June 1863, p. 1145.

subsided; but a scarlatinal eruption had broken out over the body. The eruption was of a character so indefinite, as to leave some doubt as to whether it might not be due to the rubefacient action of the turpentine stupes that had been freely employed. Next day, on returning to see the patient, he was told that the eruption had disappeared. It reappeared after a time, and again disappeared; and came and went in this way for a couple of days till the patient died. She had had scarlatina some years before. This time there was slight sore-throat, but not much; and the diagnosis had been very difficult at first, and the case peculiar, in that the premonitory symptoms seemed rather to point to mania than to any kind of eruptive disease.

Case II.—In the second case, on the second or third day after the birth of a fourth child, the patient fevered and showed a scarlet eruption all over the face, trunk, and limbs. The tongue and throat were clean; but the pulse was so weak and quick, that he (Prof. S.) had been led to form but a gloomy prognosis. She had, however, ultimately recovered. Probably all the Fellows had seen such cases; and he would like just to make this remark, which was applicable alike to small-pox, measles, and scarlatina, that when they occurred in a pregnant female they very rarely proved fatal to her, whatever the date of pregnancy might be; or if they did not attack her till ten days or a fortnight had elapsed after her confinement, they were not specially dangerous; but whenever they appear in a woman within six or eight days after her delivery, they are always alarming and very often fatal.

Case III.—Rather more than a year ago, a lady who had been placed under his care, died very suddenly of measles coming on shortly after delivery. The disease had appeared in one of the children more than a fortnight before the period of her confinement was due, and he had her immediately separated from the family, who were staying about two miles out in the country, and brought into town, and no kind of direct communication was allowed to take place between the two houses. Her labour, her thirteenth, was effected on a Wednesday, without any notable peculiarity, and she continued well for some days thereafter. But on the Sunday afternoon she had a tremendous rigor, which was succeeded in the evening by a high degree of fever, and during the night by great restlessness. Copious perspiration and a free evacuation next forenoon greatly relieved her; but in the afternoon the rigor returned, succeeded by a high fever, with burning hot skin and rapid pulse. Towards morning the brow became rough and red, and it seemed for a time as if an eruption were about to break out on the face. The pulse came down a little during the forenoon; but the rigor having recurred in the third afternoon, the patient sank and died, fifty-two or fifty-three hours after the occurrence of the first shivering-fit. The *post-mortem* examination, which was made by Dr. Turner, revealed no special local lesion other than those changes which are found in the liver and other glandular organs in patients dying of rapidly destructive fevers. It would, perhaps, have been impossible to say with absolute certainty that this puerpera died of an attack of measles; but at the time of her death, he (Prof. S.) had no doubt as to the nature of her attack, and his opinion was confirmed when, some days afterwards, an eruption of measles appeared on the baby, although it had been kept away from the infected household.

The remarks he had made with regard to scarlatina and measles held good with respect to small-pox also. There were many cases on record where small-pox, having attacked a pregnant woman, had run its course without producing any very alarming symptoms in

herself, though it caused the death of her intra-uterine offspring. But when it came on within a short period after delivery had been effected, it was extremely dangerous.

Case IV.—A patient who had been delivered in the Lying-in Hospital last month, had been seized with small-pox seven days after her confinement. There was a distinct vaccination-scar on her arm. There was not a very profuse crop of vesicles ; but on the tenth or eleventh day, some petechiæ spots appeared on the chest, which multiplied in number and increased in size till some of them looked like ecchymoses ; and on the sixteenth day she died.

With regard to diagnosis, he might remark that it was not always very easy at first sight to determine the nature of the case, when a puerperal woman became the subject of an eruptive fever. He once saw a case along with Dr. Newbigging, where some of the symptoms looked like those of scarlatina, but no eruption whatever could be detected. Some of the children, however, afterwards became ill, and in them the scarlatina eruption was quite distinct. The case was the more remarkable that a sister of this lady, who had also been recently confined, but who was living in the country, and had no communication with the affected household except through the doctor, was attacked with scarlatina and died also. He (Prof. S.) did not agree with Dr. Ramsbotham in supposing that the poison of the special epidemic fever was retained in the system of a puerperal woman some time before it broke out ; he rather believed that it ran in them its usual course. It was difficult to determine the cause of the great fatality of these fevers in such patients ; but it was probably due partly to the weakened condition of the system, but still more to the presence at that time in the blood of a quantity of effete material, which was ready to be thrown into a kind of septic destruction whenever the materies morbi was introduced.

Case V.—When speaking of puerperal disease, he (Prof. S.) might perhaps be allowed to read the notes of a case of purpura, which had occurred in one of the patients recently delivered in the Lying-in Hospital. It was the first of the kind he remembered ever to have seen ; but Dr. Lyell of Newburgh, who had been in town, and to whom he had mentioned this case, told him that he had seen two instances of the disease, one of them marked by this peculiarity, that delivery was attended with severe post-partum hemorrhage. The notes which he (Prof. S.) now begged to read, had been drawn out by Dr. Murray, House-surgeon to the hospital :—

"M. F., æt. 24, cook, entered the Maternity Hospital on 12th December at 12 noon, in labour with her third child. She had been in labour about twelve hours previous, and on examination the os uteri was about the size of a shilling, and her pains very severe and frequent, only a minute or two being between each pain. On inquiry, it was ascertained that she was only in her seventh month of

pregnancy, and that she had always been in the enjoyment of good health, having been engaged as cook in a gentleman's family, up to the time of entering the hospital. She has always had the best and most nourishing food, and has not been addicted to intemperate habits, 'in drinking' at least. From extensive inquiries made at her friends, her statement has been confirmed on these points, and further, they state that, though possessing ample opportunities for observation, they never saw any spots or eruption on the skin. The patient, however, states that for the last few months her urine had been scanty and high coloured. On entering the hospital, the only thing noticeable was that her eyes were somewhat congested, and that she had a dull and stupid appearance. Nothing, however, was to be seen on her skin. Half-an-hour after entering the delivery-room, she complained of a sensation of intense itchiness over her whole body, which was immediately followed by the sudden appearance of an eruption resembling nettle-rash. She had also intense thirst; frequent desire to pass her urine, which was high coloured. The eyes became more congested; the pains, however, diminished in severity. A marked feature in the case was severe vomiting, which reduced her strength very much, and for which she was ordered a tablespoonful of brandy in water every hour.

"13*th December*, 4 P.M.—The membranes ruptured, when a still-born child was delivered immediately; the placenta came away in a few minutes, and the discharge was as usual. The child, from its appearance, must have been dead some time.

"*Evening*, 11 P.M.—Sent for the nurse, complaining of severe vomiting, which had continued at intervals since she left the delivery-room, about 5 P.M.; though very thirsty, could not retain any fluid on the stomach.—℞ Acidi hydrocyanici med., ♏ij.; aquæ ℥i. *Sig.* Fiat haustus, to be taken immediately. Vomiting greatly relieved. Patient passed a very restless night, but did not complain of any pain or any other thing. Had a peculiar action of her hands, as if she felt some difficulty of breathing. Nothing, however, was noticeable in the chest. Pulse 108, quick and feeble. Nothing to be seen on the skin.

"14*th*, 9 A.M.—Patient's face has an œdematous appearance; eyelids, especially the lower, very œdematous. Complains of severe pain in the back and loins, which are tender on pressure. Conjunctiva very much injected. A dark red appearance over the whole body. Intense heat over the whole surface. Pulse 110. Respiration sighing and long drawn. Pain in the back still continues. Answers questions intelligently. Lochial discharge slightly diminished in quantity, having rather an offensive smell.—℞ Tr. aconiti, ♏xij.; aquæ @ ℥iij. A teaspoonful every half-hour. Wet cloths (cold) to be applied to the head. Makes water frequently and in small quantity. *Vespere.*—Pulse 94. Pain in the back *excessive* (with diminished amount of urine), causing her to start every moment.—℞ Pul. Doveri gr. vi.; Tales duo. Whole body was swollen, and foot pits slightly on pressure.

"15*th*.—Patient has been relieved of pain, but has not slept. The face, arms, legs, and indeed the whole body, much swollen, pitting on pressure, and of a dark crimson appearance. A feeling of stiffness over the whole body. Conjunctiva greatly injected, almost distended with effused blood. Had a severe attack of bleeding from the nose, which came on at short intervals till her death. Tongue densely coated; pulse 120, quick and feeble. Skin intensely hot, communicates a burning sensation to the touch; has a universally dark-red appearance. Vomiting almost gone. Stools are of a dark appearance.—℞ Tr. ferri muriatis, ♏x.; Sp. ether. nit., ℥ss. M. fiat haustus.

Afternoon, 3 P.M.—Urine passed in greater abundance. Skin still very hot

and pungent; pulse 130. Some urine was now drawn off by the catheter, when it was found to be very dark and thick. Tested by heat and nitric acid, it became denser, but did not coagulate, and on cooling, deposited a thick dark-brown sediment. Under the microscope it showed numerous blood-corpuscles and some epithelial cells. *Evening.*—Lochia entirely suppressed. No tenderness on pressure over the region of the uterus. Injected a weak solution of Condy's fluid into the uterus, and gave a hot-air bath for one and three-quarter hour; the latter produced a copious perspiration, relieving the swelling of the body and causing a disposition to sleep.

"16*th.*—Patient passed a quiet night; swelling of the arms gone down; body feels easier; pulse 120. *Small petechiæ* observable on the eyelids and cheek-bones. Ordered hot cloths to the vulva, to restore the lochial secretion if possible. Sudden supervention of pain over the uterus. Cold cloths to be applied to head, and hot cloths to vulva, uninterruptedly. While this was being done, patient's pulse suddenly fell to 90, when she felt easier and looked quieter; but if these means were intermitted, pulse rose to 120, and she again complained of uneasiness in the abdomen.

"11 P.M.—An abundant crop of petechiæ was observed on the legs. A few being intermixed with bluish-black spots on the abdomen. The patient, however, complained most of her throat, and said that she could hardly swallow. She spat a considerable quantity of blood. On examination, not much was to be seen, possibly from the difficulty of obtaining a right view of it. The upper part of the chest on both sides was resonant on percussion, but the breathing on the posterior part of the right side was somewhat bronchial.—℞ Potassæ chloratis, ℈i.; Acidi hydrochlorici, ♏xx. Fiat gargarisma. Ordered wine.

"17*th.*—Patient has passed a very restless night; lips and teeth covered with *sordes;* throat much worse. Patient speaks indistinctly; pulse 120, very feeble. Complains of a sore feeling all over her body. Skin was rubbed off the left elbow; has bled freely at the nose. Petechiæ on the face almost grown to ecchymosis.—℞ Quinæ disulphatis, gr. v.; Acidi sulphurici dil. ♏iv.; Vini Xerici, ℥ij. To be administered frequently.

"1.15 P.M.—Patient's breathing short and difficult, accompanied by a crepitating sound, and occasionally by a puffing out of the cheeks, as in apoplexy. Voice almost gone; but consciousness quite retained.—Died at 3 P.M.

"The autopsy was made by Dr. T. Grainger Stewart.

"*Integumentary System.*—Body well nourished. Over the abdomen we have abundant striæ gravidarum. Face generally of a sallow colour; here and there are ecchymosed spots elevated above the surface, varying in size from a pinhead to a florin. Conjunctiva intensely reddened. On the back of the thorax the cuticle is abraded and the epidermis extremely congested, there being a bag of blood below.

"*Epidermis.*—The whole surface of the body, and particularly the legs, are covered with purpuric spots. In the substance of the muscles, bloody spots are also seen.

"*Viscera.*—Sanguineous effusion into pleura. Hemorrhage into lungs. Old pleurisy of right side, with adhesions. Heart flabby, with hemorrhagic spots on its surface. Bloody fluid in the peritoneum. In the upper half of small, and whole of large intestines, abundant bloody patches. Liver soft and brown-coloured. Some hemorrhage had taken place into the capsule of Glisson. Spleen somewhat enlarged, soft, and full of pulp. Slight effusion on the surface of brain. Hemorrhage into the substance and pelvis of the kidneys.

"*Uterus.*—Walls 1¼ inch thick, 9 inches long. When opened up, measured about 1 foot across, and contained a bloody decidua."

PATHOLOGICAL OBSERVATIONS ON PUERPERAL ARTERIAL OBSTRUCTION AND INFLAMMATION.[1]

It is only within the last thirty years that the inflammation and obstruction of veins has become a prominent subject of research. Yet all are now ready to acknowledge the high practical importance of phlebitis, and its effects in puerperal, in surgical, and in medical pathology.

The inflammation, however, and obstruction of arteries has hitherto been little attended to, especially in midwifery. They are not subjects mentioned even, so far as I know, in any obstetric work; and, doubtless, they are not so common as venous inflammation and obstruction. But arterial obstruction and inflammation will be found, I believe, to be much more frequent than is supposed—1. When we come to know better, and really search for, their effects and symptoms in the living body; and 2. When we do—what has hitherto been almost entirely neglected to be done—namely, look properly for their existence in our dissections of the dead body.

In the present communication, my principal object is merely to prove the fact that arterial obstructions do occasionally occur in the puerperal patient, and are accompanied with various important pathological consequences. As far as our present very limited and very imperfect investigations go, these arterial obstructions in the puerperal female seem capable of being produced by a variety of morbid causes, particularly—1. By the separation of old or organised cardiac vegetations, and their subsequent transference into the arterial canals; 2. By the passing forward into the current of the circulation of recent fibrinous masses formed in the cavities of the heart or larger arterial vessels; 3. By local arteritis; 4. By laceration of the internal coats of the occluded vessels; and 5. By morbid materials carried from the systemic venous system, and lodged in the pulmonary artery or its branches. I propose to adduce one or more examples illustrative of each of these pathological causes of arterial obstruction in the puerperal female; and to add a few

[1] Communicated to the Medico-Chirurgical Society of Edinburgh, January 4, 1854. The following essay is drawn up from the notes used on that occasion; but several more recent cases are now added to it. See abstracts of the communication in *Edinburgh Monthly Journal of Medical Science*, February 1854, pp. 175 and 181; and in *Association Medical Journal*, January 13, 1854, pp. 41 and 43.

general remarks upon the causes, and the symptoms or effects of such obstructions.

Section I.—Arterial Obstruction from Separated Cardiac Vegetations blocking up the Arteries.

This pathological cause of sudden arterial obstruction was for the first time, I believe, specially noted in a puerperal patient whom I attended in 1842, along with Dr. Abercrombie and Dr. Beilby. The following particulars with regard to the case are stated by me in the published Proceedings of the Edinburgh Obstetric Society for 15th June 1847.[1]

Case I.—The lady, about a year before becoming pregnant, laboured under a very severe attack of rheumatic endocarditis. During the later months of utero-gestation, she suffered greatly from attacks of difficult breathing, which amounted sometimes to orthopnœa. About the eighth month hemorrhage suddenly supervened, and I found that, in addition to her other complications, she had the edge of the placenta projecting over the posterior lip of the uterus. After the os uteri was nearly dilated, the membranes having been ruptured some hours before, without entirely suppressing the very severe and exhausting hemorrhage that was present, I extracted a child, who is still living, with the long forceps. The mother seemed for the time to make a most perfect and satisfactory recovery. Some symptoms of irritation, however, supervened; and, during the second week after her confinement, I one morning found that there was no pulse to be felt in the right arm lower than the elbow, whilst it was distinct and strong down to that point. This forearm had felt, for some hours previously, coldish, stiff, and benumbed. In the course of a few days, the pulsation in the right radial artery gradually but feebly returned; but the circulation, first in one and then in the other leg, seemed to be similarly affected. At last, unequivocal symptoms of erratic phlebitis began to show themselves, and, five weeks after delivery, ended in a fatal attack of phlegmasia dolens in the left arm and left side of the face. On opening the body, the vena innominata on the left side, and its affluent trunks, were found entirely obstructed by coagulable lymph. The humeral artery, at the bend of the arm, was shut up by an obstructing mass or coagulum; but the inner coat of the vessel had no appearance whatever of laceration. The valves of the left side of the heart were profusely covered over with small wart-like excrescences. The lower limbs were not examined.

In first describing the preceding instance of puerperal disease to the Obstetric Society, I proposed the three following questions:—1. "Was the obstruction of the artery, or arteries, in this case, produced by any mechanical cause, as one of the vegetations separated from the cardiac valves, carried along, in the case of the arm for example, to the bifurcation of the humeral artery, and impacted there?" 2. "Was it not rather the result of an original puerperal

[1] See *Monthly Journal of Medical Science*, September 1847, p. 211.

arteritis?" 3. "Or might it be the effect of an effusion of coagulable lymph from phlebitic inflammation in the coats of the artery, a secondary phlebitic deposit upon the lining arterial membrane?"

In the summer of 1853, I saw, in consultation with my friend Dr. Moir, a similar case, in which, from the symptoms present during life, I made the diagnosis of arterial obstruction from separated cardiac vegetations—an opinion that was confirmed by the results of the autopsy.

Case II.—The patient was prematurely delivered in the country, of her first child, and continued to recover favourably for three weeks, when remittent feverish symptoms and diarrhœa supervened, and the lochia became slightly hemorrhagic. Soon afterwards, pains, like those of neuralgia, were experienced in the right leg, and then in the left, where they remained fixed and occasionally very violent. Seven weeks after delivery, sudden pain and tenderness came on in the left groin. At this time I heard a loud systolic bruit on listening to the heart. No rheumatism had preceded. Some days subsequently, the pulse in the right arm became arrested suddenly, as the evening before it had been felt by Dr. Moir. Next day a careful examination was made of the arteries of the two lower extremities. No pulsation could be traced in the left femoral artery or its branches. The pulse in the right femoral and iliac was very weak, and in a day or two entirely disappeared, so that now the arterial pulsation in the larger vessels of all the extremities had ceased, with the exception of the left arm. It returned slightly for a few days before death, in the right wrist. At last, in the left lower extremity, where latterly there had always been excessive pain, gangrene of the great and two next toes began, ten weeks after delivery; and the mortification had not extended beyond these toes when the patient gradually sank, and died a few days afterwards.

On opening the body, and examining the heart, the aortic aperture was blocked up by a mass of valvular excrescence, which appeared nearly as large as the whole calibre of the artery. It is represented in the accompanying woodcut, Fig. 17. This excrescence was composed of three portions, one attached to each of the three semilunar valves. The left valve presented only a comparatively small excrescence on the centre of its free border. The vegetation attached to the right valve formed by far the largest proportion of the morbid mass; while that on the posterior valve was intermediate in size. The whole excrescence seemed of comparatively recent formation, being very friable and granular. In each valve, the corpus Arantii seemed the centre of the morbid growth, and each vegetation appeared to have been originally developed between the two serous layers of the valves, and only secondarily to have protruded through these layers, and become projected, as cauliflower-like growths, into the free cavity of the vessel. The openings of the coronary arteries were unaffected. Around the margin of the left auriculo-ventricular

orifice were a number of small red excrescences or carunculæ, about the size of sago-grains, but evidently of the same nature as the larger masses placed on the aortic valves. The pericardial surface of the heart was healthy. The aorta at the fourth lumbar vertebra, and iliac vessels, were firmly bound by exudation to the surrounding parts. The aorta was found occluded at its lower extremity, by a large irregular mass, composed of small portions similar in consistence and general appearance to the vegetations formed on the aortic valves. The mass thus situated in the aorta extended more than two inches above its bifurcation, and was somewhat conical in form—the apex pointing upwards, while prolongations

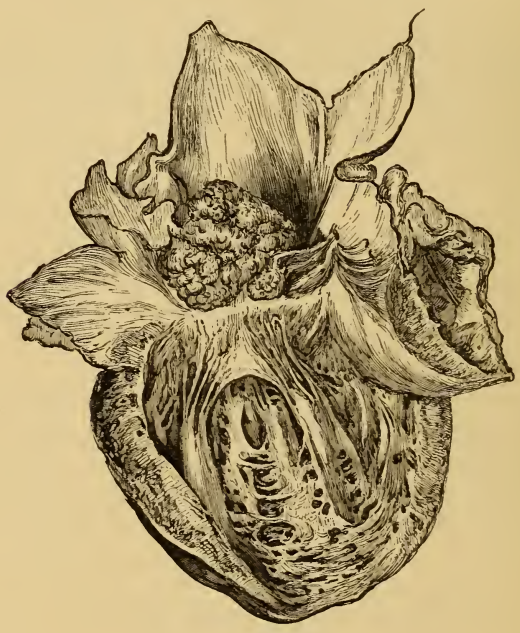

Fig. 17.

were sent from its base along the common iliac arteries on each side. It was loose, and unattached to the walls of the vessels, and was covered with a coating of dark-coloured blood, through which, at scattered points, portions of the granular structure were seen projecting, not coloured like the rest, but bearing to the naked eye a marked resemblance to the valvular excrescences in the heart. In the right common iliac artery, some of the detached concretions were found not covered with blood, but lying loose in the canal of the

vessels, and were there seen to be of a greyish colour, and granular appearance. The external iliac arteries on both sides were occupied by sanguineo-purulent matter, and here and there mixed with this purulent matter were small granular concretions, similar to the

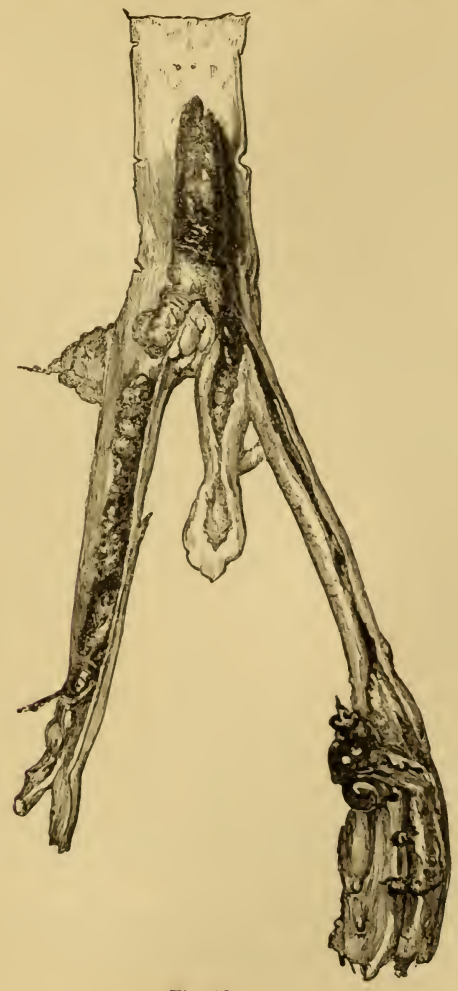

Fig. 18.

granular mass above. On the right side, this inflammatory appearance of the artery extended down as far as Poupart's ligament, but on the left side it reached two inches below Poupart's ligament; and a small granular mass was found blocking up the origin of the pro-

funda on the left side. Two inches down the left internal iliac artery, a pulpy mass was found blocking up the vessel, and from this a yellowish pus extended upwards to the origin of the artery. The mode and extent to which these concretions filled up the lower part of the aorta is represented in the woodcut, Fig. 18. Let me add, that the whole coats of the obstructed vessels were thickened, and the lining membrane in contact with the occluding masses was of a deep scarlet colour. Along the external iliacs the lining membrane assumed a dirty red colour. The left femoral vein, for two inches below Poupart's ligament, was occupied by a fibrinous clot. The lower part of the right humeral artery presented an inflammatory condition, in some respects similar to that of the iliac arteries. No portions of excrescence were found in its cavity, but at the bifurcation into the radial and ulnar branches, a pulpy mass was seen adherent to the lining membrane of the vessel, and seemed like a small granular portion of the valvular excrescence broken down and mixed with pus, which occupied the vessels at this situation. The humeral artery, as far upwards as the pectoralis minor, and the radial and ulnar branches for several inches downwards, were quite obliterated and seemed like small cords, firmly bound by exudation to the adjoining textures. When a portion of the mass from the aortic valves was placed under the microscope, it was seen to be composed of separated fatty granules, with blood corpuscles, and a few compound granular cells interspersed. The sanguineo-purulent matter in the neighbourhood of the masses deposited in the aorta and other vessels, was seen to be crowded with pus corpuscles; while the masses themselves were chiefly composed of fat granules, blood corpuscles, and compound granular cells, like the excrescence present on the cardiac valves. The uterus presented no appearance of disease either in its cavity or walls. The spleen was pulpy and diffluent, except at one point, where there was a small mass of a cheesy consistence and greyish-white colour. The other viscera were healthy.[1]

For notes of the following two analogous cases, I am indebted to the kindness of my friends, Professor Macfarlane of Glasgow, and Dr. Lever of London.

Case III.—In this instance, the obstruction of the artery occurred suddenly ten days after the lady was delivered naturally and easily of her fifth child. At that time she began to complain of acute pain and numbness in her right arm,

[1] The morbid parts in this case were, when still recent, shown to the Medico-Chirurgical Society.

which, with slight intermission from opiates, etc., continued till her death, which took place at the end of three weeks. No pulsation could, from the first or subsequently, be felt below the middle of the brachial artery. A week after this arterial occlusion in the upper extremity, a similar change took place in the right thigh, accompanied with acute pain. This ceased in a great measure four or five days after, when unequivocal indications of gangrene showed themselves, commencing at the toes and extending to the knee. On dissection, the aortic valves were found by Dr. Macfarlane covered with numerous vegetations, none of which exceeded in size a grain of linseed. The aorta was dilated and studded over with atheromatous deposits. At the points of obstruction (viz. the middle of the brachial, and the commencement of the lower third of the femoral arteries) fibrous clots were found, which completely closed these vessels. The upper or cardiac end of the clots contained, and was firmly attached to, *a small hard body*, which, on more careful inspection, was found to be identified in size, appearance, and structure, with the aortic excrescences.

Case IV.—This patient suffered under an attack of acute rheumatism during pregnancy, and died of a few days' illness after delivery. During the short illness following the confinement, it was discovered by Dr. Lever, who attended the lady, that there was no pulsation in the arteries of the left arm ; and subsequently the same want of pulse was observed in the left inferior extremity. The pain in both extremities was distressing ; the hand and foot were both livid in colour, and local symptoms of gangrene were manifest in each. At the post-mortem examination, mushroom-like vegetations were discovered on the valves of the heart ; and in the arteries of both the affected extremities vegetations were found obstructing their canal, and in the veins of both were phlebolites.

The first case which I have mentioned above, occurred, as I have already stated, in 1842, and was published in 1847. During the same year, 1847, Professor Virchow of Wurzburg, perhaps the most original and industrious of living pathologists, published an essay on inflammation of arteries,[1] in which he mentioned several cases of arterial obstruction apparently produced by cardiac vegetations detached and carried forward into the arterial circulation. In 1852, Dr. Kirkes read an excellent paper before the Medico-Chirurgical Society of London on the same subject ;[2] and Ruhle,[3] Tuffnel,[4] and other pathologists have subsequently reported some additional instances. The cases observed by Virchow, Kirkes, Ruhle, etc., were not in puerperal patients. The instances detailed by Kirkes and Ruhle referred principally to detached cardiac vegetations lodging in the cerebral vessels, and producing death by encephalic lesions. The following interesting case, which occurred in the wife of a very

[1] "Ueber die akute Entzündung der Arterien," in *Archiv für Pathologische Anatomie*, vol. i. (1847), part ii. p. 272. See cases, pp. 338, 342, etc.

[2] London *Medico-Chirurgical Transactions*, vol. xxv. p. 285.

[3] "Three cases of Hemiplegia produced by the plugging of one of the cerebral arteries."—*Medical Times and Gazette* for March 1853, p. 299.

[4] *Dublin Quarterly Journal of Medical Science*, vol. xv. (1853), p. 371.

esteemed obstetrical friend, shows that the same lesion may occur from the same cause in the puerperal female. For the following particulars of this case I am indebted to Dr. Burrows, who, during the life of the patient, made a perfect diagnosis of the exact morbid states found after death.

Case V.—The lady was seen by Dr. Burrows about six weeks after delivery; she was then in that state of semi-hectic which results from over-lactation. Besides this she had obscure pains in the limbs, resembling rheumatism, and more particularly pain in the calf of one leg, and other symptoms, which led him to suspect she might have abscesses forming. All these symptoms gradually abated, under the influence of cessation of lactation, great quietude, tonics, and change of air. While in the country, however, and after rather more exertion than common, she became suddenly hemiplegic on the right side, but without symptoms of cerebral congestion. Dr. Burrows saw her on the following day, and immediately suspected the case to be one of the class detailed by Dr. Kirkes. Auscultation confirmed these suspicions, for there was a loud rasping systolic murmur over the valves. The hemiplegia and impaired powers of speech and memory remained to the time of death.

At the autopsy abundant vegetations were discovered on the mitral and aortic valves, so that they were softened and ulcerated through. The left corpus striatum was reduced to a mere diffluent pulp, and the branch of the left middle cerebral artery passing to this part of the brain was obliterated with a small mass of fibrin, like a grain of wheat, implanted in the vessel at its origin from the middle cerebral artery. The artery beyond the obstruction looked like a pale thin string, and was quite impervious. The arteries of the limbs, in which the patient, at an early part of her illness, had suffered so much pain, were not examined.

The five preceding cases were all apparently of the same nature, and there were two special circumstances true as applied to the whole of them—1st, In all the five, vegetations were found on the aortic valves; and 2d, Loose bodies, having the same physical appearance and structure as the cardiac vegetations, were discovered on dissection in the obstructed arteries.[1] That the cause of arterial obstruction in these instances was not local arteritis, is proved by the supervention of the symptoms of arterial obstruction being sudden and almost instantaneous; and by the obstructed artery, in some instances, as in Case V., showing no post-mortem evidence of thickening or previous inflammatory disease. In all, the vegetations were probably the result of previous endocarditis; and in three of them,

[1] In Ruhle's first case, in a patient aged 19, the cardiac vegetation found on the aortic valves, and the plug found in the left arteria fossæ sylvii, were both calcareous; and the walls of the occluded artery were healthy and free from all inflammatory changes. In a similar case reported by Dr. Burrows, both the cardiac vegetation and the plug in the middle cerebral artery were cretaceous. See *Medical Times* for 1853, pp. 136 and 299.

rheumatic symptoms had been present at a preceding period of life. Further let me observe, it seems certain, that if vegetations are once detached from the cardiac valves, they must be carried forward in the current of the circulation. Are there, however, any circumstances or reasons which render it probable that such vegetations ever become detached? In favour of this view analogy may be appealed to in reference to the spontaneous separation of adventitious structures in other parts of the body. Thus, cartilaginous and other pediculated bodies become detached in the interior of joints; polypi from mucous surfaces; and polypoid or fibroid growths, from the free surface of the peritoneum, as described by Dr. Reid and Mr. Hodgkin. In the heart there are conditions which render the separation of vegetations much more probable than perhaps the detachment of polypoid growths in other parts of the body. For, 1st. The vegetations, whether sessile or pediculated, are often loosely attached, being easily removed, after death, with the handle of the scalpel. 2d. The valves to which they are adherent are parts constantly in motion. 3d. Currents of blood are ever rushing over them with considerable force. When the vegetations are once separated, they will be carried along, until, meeting at last with a vessel whose calibre is smaller than their bulk, they become impacted; or they may become arrested where a larger vessel divides into two branches, each of which is smaller than the detached vegetation. In the occluded artery more than one result may follow such impaction. Accumulating coagula may be formed from the blood around and behind the obstructing mass. The artery may inflame at the site of its occlusion, and this inflammation may ultimately involve, as in Case II., the accompanying vein. The vegetations and coagula thus deposited may at last become disintegrated and pulpy, as occurred in the first and second instances of the group of cases that we have now described; and their own detritus, or the inflammatory exudations formed around them, may pass downwards and obstruct still smaller arteries beyond; or, if minute enough, may even traverse the capillary circulation, vitiate the general mass of blood, and produce, as in Case I., phlegmasia dolens, or other consequences. And lastly, the arterial pulse may betimes become restored in the artery below, either from gradual clearance or dilatation of the obstructed vessel above; or, as perhaps happens more frequently, from an increase in the collateral circulation.

Section II. — Arterial Obstruction from the escape of Recent Fibrinous or Unorganised Coagula from the left Cavities of the Heart, or from the larger into the smaller Arteries.

In the well-known experiment when recently-drawn blood is actively stirred, or whipped *with* a rod, the rod forms a mechanical nucleus around which the fibrine readily and speedily coagulates. In the same way in the living system, under particular circumstances, when the blood in the heart or large vessels is carried or whipped *against* a fixed rod or a rough body, occasionally such obstructing points constitute mechanical nuclei upon which coagula form, and from which they may subsequently separate and be carried forward with the arterial current till they are ultimately arrested in some arterial canal too contracted and small to allow them to pass farther. Accident has sometimes offered us a kind of crucial pathological experiment upon the living human being demonstrative of the preceding remark. Thus, in a case shown in 1849 by M. Laugier to the Anatomical Society of Paris, a needle happened to be thrust through the apex of the heart into the cavity of the left ventricle. The needle was found after death, fixed with its long axis running vertically from the apex of the heart towards the aortic orifice of the ventricle. The patient, a young man, to whom this accident happened, died with gangrene of the left leg. It became an interesting pathological question, what was the relation between the cardiac injury and the gangrene of the limb? The dissection seemed to resolve this problem. For the whole length of the needle projecting into the cavity of the left ventricle was covered with decolorised, irregular concretions, which were prolonged beyond the apex of the needle into the cavity of the aorta. The lower end of the aorta and the iliac arteries were filled with adhering sanguineous concretions; and it occurred, observes Cruveilhier, to all the members of the society who saw the preparations, that some of the clots formed around the foreign body in the left ventricle of the heart had been projected forward from it into the arterial canals, and become there the nuclei of new obstructing concretions.[1]

In the preceding case we have a foreign body, in the interior of the left ventricle, forming a basis around and upon which unorganised

[1] See Cruveilhier's *Traité D'Anatomie Pathologique Générale*, tom. ii. pp. 201, 296, and 388.

sanguineous concretions accumulate; and these concretions, soon after their formation, becoming detached and projected into the arterial canals so as to close them, produce gangrene — like the similar arterial plugs resulting from the separation and transference of old and organised valvular vegetations. But if the interior of the same ventricle be anywhere mechanically rough and irregular—not by a foreign body, such as a needle—but by the results of disease, as from the presence of globular polypi in the cavity, vegetations on the valves, or endocarditic inflammation of its lining membrane—similar unorganised coagula may at times form, in superfibrinated or other morbid states of the blood, upon these roughened and diseased points, and subsequently shut up arterial canals in different parts by being projected from the heart into the current of the circulation. Thus, in a case described in 1837 to the French Academy of Medicine by M. Legroux,[1]—a lady, aged 29 years, passed through an attack of acute rheumatism. Three months subsequently to her first attack there was uneasiness in the precordial region, an irregular pulse, and a loud bellows sound; and these symptoms were attributed to endocarditis. Antiphlogistic treatment was employed. At the end of a month she seemed to be getting well, when all at once violent pains came on in the legs and feet, with coldness of the extremities. In a fortnight the arterial pulsations had completely ceased in the lower limbs. Eight days before death, the same symptoms were observed in the left arm, and the pulsations ceased there also. The pains continued to the last; no gangrene took place. On post-mortem examination the cavities of the heart were found to contain old and adherent fibrinous clots; and the lining membrane of the auricles had lost its polish and transparency. The right subclavian artery, the termination of the aorta, and the common and external iliac arteries, were completely obliterated by old and adherent clots. The right iliac artery was dilated, at the level of the hypogastric, to the volume of a nut, and contained a fibrinous, cystiform coagulum. Three of the lumbar arteries were closed by clots, which projected into the aorta like the heads of nails. As M. Legroux points out:—1st, This disease was originally rheumatic endocarditis. 2d. In consequence of this

[1] "Cette opinion est fondée sur des faits assez nombreux recueillis par lui (M. Legroux), et dont il possède les pieces anatomiques,—faits qui démontrent, dit il, une coincidence presque constante entre les caillots obturateurs des artères, et des caillots anciens dans les cavités du cœur." In the history of the subject this passage is important, as having been published in 1837.

endocardial inflammation, fibrinous coagula were formed in the cavities of the heart. 3d. The obliteration of the arteries was commenced by the expulsion of these coagula from the heart into the vessels.[1] 4th. The arterial obliteration, at first imperfect, was completed by successive additions of coagulum; for the structure of the clots indicated that they had been formed at various times. 5th. Probably the adherence of the coagula to the walls of the artery was the result of inflammation, caused by the presence of the clot as a foreign body, the inner membrane of the artery being only notably altered at points where the obliteration had existed for some time; that of the subclavian, for example, which was recently closed, being only slightly injected.

In the puerperal state—with the blood, as in rheumatism, overcharged with fibrine and otherwise anormal—recent coagula seem sometimes to form on rough points in the interior of the heart, and subsequently becoming projected into the arterial current, shut up one or more arterial canals. To produce this result two elements are perhaps necessary:—1. A chemical tendency in the blood, from super-fibrination or other causes, to coagulate; and 2. Mechanical facilities for the formation of coagula from the presence of rough surfaces or projections. The two following cases of puerperal arterial obstruction probably belong to this category. In the first of these cases, a rough globular polypus, such as is sometimes found in the interior of the heart as a result of phlebitis and endocarditis, seems to have served as a nucleus for the formation of the sanguineous coagula or concretions. In the second case, for notes of which I am indebted to Professor Macfarlane, rough cardiac vegetations, which did not, however, themselves separate, appear to have acted a similar office.

Case VI.—The patient, æt. 33, was admitted into St. Thomas' Hospital, August, 2, 1853, under the care of Dr. Risdon Bennett.[2] She had generally enjoyed good health, but for several weeks before her last confinement, which took place nine weeks before her admission, she had debility, dyspnœa, and œdema of the legs, with pain in the left side and occasional palpitations. She had never suffered from rheumatism. Her labour was difficult, and her recovery after it had been imperfect. A fortnight before admission, she had pain across the chest and down the left arm. A week later there occurred apparent syncope, followed by impaired vision and slight cough, with frothy bloody expectoration. When she entered the hospital she seemed extremely ill, but there was no sufficient cause discoverable to account for her alarming symptoms. There was, however,

[1] *Bulletin de l'Académie de Médecine*, 1837, tom. i. p. 434.

[2] This interesting case has been published by Dr. Bennett in the *Provincial Medical and Surgical Journal* for 1854, p. 143.

tumultuous, feeble, and irregular action of the heart, attended by a variable bruit. Besides this there was some puffiness of the ankles, and pain and tenderness generally in the lower extremities. On the 5th, or three days after admission into the hospital, the left leg appeared much as if affected by phlegmasia dolens. It was painful, paler than natural, and towards the foot of a lower temperature than the rest of the body. A day or two after this the opposite limb exhibited similar symptoms, and then the toes of both feet became shrivelled and parchment-like. By the 13th of August both limbs were gangrenous, some vesication appeared on the thighs, and no pulsation could be felt in the femoral arteries, even under Poupart's ligament. On the 3d of September she became typhoid and died on the 6th. At the *autopsy* no vegetations were found on the cardiac valves, but under the attached fold of the mitral valve, a thinning of the walls of the left ventricle existed, and a notable bulging of the cavity like a commencing, "diffuse true aneurism." This cavity did not contain coagula, but at the apex of the ventricle was a partially adherent globular cyst or polypus, and another very similar was found in the right ventricle. These polypi were softened in the centre, and filled with pus-like matter. The aorta was empty as far as the origin of the superior mesenteric artery. From this point downwards it was filled with a clot in different stages of change. Just at the bifurcation of the aorta the clot seemed to be very firm, and adhered with more tenacity on the left than on the right side, where the artery continued patent for some distance lower. The iliac arteries, common, external, and partially internal, were blocked up, as was also the femoral, for two inches below the groin. The clot adhered pretty firmly to the arterial walls, but when peeled off, the internal coat was not roughened. The clot had begun to soften in different parts, more especially along the aorta itself, and the products under the microscope were precisely similar to the one presented by the globular cysts or clots in the heart. All the arteries which were given off from the aorta between the superior mesenteric and deep femoral were blocked up for a short distance. Each of the femoral veins at the groin contained a short recent clot. The crural nerves were implicated in the surrounding inflammatory changes and thickening. In both kidneys there were fibrinous or purulent deposits. All the other organs examined were healthy.

Case VII.—A lady, aged about 38, had, after an attack of rheumatic fever seven or eight years previously, become subject to cough and dyspnœa. Three or four years after, when Dr. Macfarlane was first consulted, the physical signs of endocarditis, and of disease of the aortic valves, were well marked. She became pregnant for the first time in 1841, and was delivered with the forceps after about thirty hours' severe labour. Six hours before delivery was effected, she complained of violent pain in the right arm, which gradually increased, and almost appeared to exceed in intensity the parturient action. As she could only lie on the right side, and was obliged to do so during the whole labour, little attention was paid for some time to this symptom, under the belief that it was the effect of position and pressure. The persistent severity of the pain, however, and the distress it appeared to occasion, ultimately led to the arm being examined, when it was found that the pulse had ceased at the wrist, and that no arterial pulsation could be detected below the axillary end of the subclavian. The pain, especially on each side of the elbow, at the wrist and in the fingers, was violent and incessant, and continued for six weeks, alleviated only from time to time by opiates, anodyne frictions, and heat. The pulsations never returned to the main vessels, but the heat of the limb was soon restored, and the shrivelled and exsanguine appearance of the points of the fingers and nails, at first so marked after the obstruction took

place, gave way to a more natural appearance as the collateral circulation became established. She died of general dropsy three months after delivery. Dr. Macfarlane could only obtain permission, and that after much importunity, to examine the state of the subclavian artery at the point of its obliteration. It was found completely plugged up between the clavicle and axilla by a firm fibrinous clot, consisting of several layers, and hence of successive growths, but it did not contain any roundish or hard portion, or any appearance whatever of an excrescence or vegetation separated from the valves of the heart.

I am not aware of any direct observations, either in the puerperal or non-puerperal states, showing that sanguineous concretions or coagula may occasionally form around rough and diseased points existing in the walls of the larger arteries of the body, and be thence separated and carried onwards into smaller arteries, so as to obstruct and occlude the latter. Such specimens, however, are not rare in our pathological museums. The Museum of the University of Edinburgh contains, for example, a specimen of this kind, unfortunately without a history. There are rough, ulcerated atheromatous spots on the interior of the aorta, with coagula adhering to their edges, and the tube of the iliac artery below is completely shut up with a mass of sanguineous coagula. In a case of gangrene of the leg, published and delineated by Sir Robert Carswell,[1] the artery of the affected limb is occluded with fibrinous concretions, and the interior of the aorta above is full of coagula, formed around atheromatous obstructions in the walls of the vessel, and all pointing downwards in the direction of the circulation.

Before leaving these two first sections, or forms of arterial obstruction, it is, perhaps, proper to observe, that the exact position and site of obstructions in the arterial tree, produced by detached cardiac vegetations, and fibrinous clots, appear to be regulated by various circumstances, some of which seem recognisable. 1st. Where the morbid mass which leaves the heart is very large, or has a large coagulum gathered around it, it sometimes proves of too great a size to pass at all out of the aorta, and is then usually carried down and lodged in the lowest part of that vessel, or immediately above its bifurcation. 2d. When of less size, and capable of entering arterial canals of the second, third, or still smaller dimensions, the course and ultimate site of the vegetation or coagulum is perhaps principally determined by the directness of the arterial current into particular arterial tubes, and by the angles at which these vessels leave their larger trunks. Thus, small solid masses floating in the blood are more liable to be carried upward, according

[1] See his *Pathological Anatomy*. Article "Mortification." Plate iii. fig. 2.

to Ruhle, into the left than into the right carotid, because the stream of blood, running from the heart and aorta, pours more directly into the former than into the latter vessel; and Virchow attributes the greater frequency of their presence in the left lower limb than in the right to a similar cause—the left iliac artery leaving the abdominal aorta at a less angle than the right. 3dly. The mode in which an artery divides may regulate their seat. Cardiac vegetations have now been very often found lodged at the mouth or in the course of the middle cerebral artery. This, according to Dr. Kirkes, is owing to the fact, that, after the division of the internal carotid into its two main branches within the skull—viz. the middle and anterior cerebral—the middle cerebral not only remains the larger vessel of the two, and hence is more capable of receiving any floating body; but further, it maintains also far more nearly than the anterior cerebral, the original direction of the trunk from which they both spring, and hence is more likely to have sent forward, into its canal, any solid body floating in the current of blood that passes upward through the carotid.

In all the preceding remarks, I have only spoken of organised vegetations and unorganised fibrinous masses passing from the heart into the arteries, of such a size as to obstruct and occlude vessels of considerable dimensions. But vegetations and coagula of a far *smaller* size are ejected from the heart perhaps still more frequently, and ultimately obstruct and collect in some of the minuter arteries and capillary vessels. The more or less decolorised, angular, lobulated deposits, frequently seen in the spleen, kidney, liver, etc., sometimes, if not always, originate in this manner, and primarily consist of cardiac concretions and fibrine, or occasionally of pus and fibrine, carried into and lodged, first, in the smaller arteries and capillaries of these parts, and subsequently accumulated in the vessels and tissues behind and around these obstructions. In other words, these instances of so-called "capillary phlebitis," or of yellowish "fibrinous deposits" in the organs named, and in other parts distant from the heart, appear to consist usually and primarily of solid particles of fibrine carried from the interior of the heart or larger vessels, and lodged and accumulated in the capillaries and smaller arteries at the sites of the deposits. Out of twenty-one instances, in which Dr. Kirkes observed these yellow or white masses in the spleen, kidneys, and other parts supplied by blood directly from the left side of the heart, he found in nineteen of the cases disease of the valves or of the interior of the heart (in fourteen there were fibrinous endocar-

dial growths); in the twentieth, the aorta was the seat of aneurism, with laminæ of fibrine lining it; and the twenty-first, or only exceptional case, was one of cholera, where a doubtful mass of capillary phlebitis existed in the liver.[1] In describing the *secondary* phenomena liable to be produced by endocarditis, Professor Hasse observes, "A considerable portion of the effused substances being carried away in the first instance by the circulation, and another portion during the period of softening, it is obvious that these inflammatory products must, just as in phlebitis, act a subordinate part within the capillary system. The spleen and kidneys appear particularly liable to such changes. In the spleen coagulated fibrine is found of some breadth at the periphery, but gradually tapering towards the centre, having mostly a tolerably sharp outline, and a brownish-yellow hue. Smaller deposits of a similar kind are met with in the cortical substance of the kidney; sometimes even intersecting the papillæ. According," he adds, "as the inflammatory product of the endocardium partakes more of the character of fibrine or of pus, the secondary deposit will be of a more or less consistent kind, and shrivel in the event of recovery, or else liquefy and terminate in abscess. Though frequent in the localities above indicated, these secondary phenomena are proportionately rare, as in the liver; sometimes, however, they occur in the serous cavities."[2]

Section III.—Arterial Obstruction from Local Arteritis.

In the two classes of arterial occlusion which I have already described, there were generally found thickening, condensation, and other evidences of inflammation in the walls of the artery at the obstructed points. But in these instances, the arterial inflammation was secondary, and not primary. It was the result of the irritation and impaction of a plug, carried from a distance and fixed in an arterial tube, which became first obstructed, and then inflamed, by its presence. But we come now to speak of another division of arterial obstructions, in which the arterial occlusion is the result, and not the origin, of arterial inflammation; its cause, and not its consequence.

Without entering into the debated question of whether or not a part possessing no *vasa vasorum*, like the lining membrane of arteries, can be itself the seat of inflammatory exudations, and whether or

[1] *Medico-Chirurgical Transactions*, vol. xxxv. pp. 307-309.

[2] Hasse on *Diseases of the Organs of Circulation*, etc. Swaine's Translation, p. 133. See also p. 61, on similar deposits after aortitis, etc.

not, in all cases of arteritis, the exudations thrown out are not secreted from the vessels of the more external arterial coats, and particularly of the cellular, it is enough for our present purpose to grant, what pathologists all allow, that local arteritis in general speedily ends in, if it does begin with, the formation of an obstructing fibrinous or sanguineous concretion in the tube of the inflamed artery.

The following well-marked case of puerperal arteritis, and arterial obstruction, terminating in gangrene, occurred to Dr. James Duncan, when acting as surgeon to the Royal Infirmary. I am indebted to him for the following notes of it. The preparation of the obstructed aorta and iliacs, in this case, is contained in Mr. Spence's surgical museum.

Case VIII.—A patient from the neighbourhood of Dalkeith was delivered of her first child after a protracted labour. Two weeks afterwards she was brought into the Edinburgh Infirmary, suffering under pain and acute gangrene of both the lower extremities. The gangrene came on rapidly, with vesication, and ascended before death as high as the thighs. The patient sank three or four days after she was placed in the hospital. On dissection no disease was found in the heart, its walls, valves, or cavities. But beginning about an inch and a half above the bifurcation of the aorta was found a fibrinous plug, which completely occluded the artery, and extended along the common iliacs, and, as far as one or two inches down the external iliac arteries on each side, a prolongation of the plug shut up also the canal of the internal iliac artery on the left side, while on the right side, the opening of the internal iliac was occluded by the obstructing mass occupying the common iliac artery. The upper end of the plug in the aorta was flattened, and some lymphy filaments passed from the arterial parietes to be attached to this superior extremity. In the aorta the mass was firmly adherent to the coats of the vessel, which coats were thickened; and apparently, at the most inflamed point, the calibre of the tube was contracted. The adhesion of the obstructing concretions to the inner coat was less along the left iliac artery; the plug in the right iliac artery was not adherent at all to the coats, but presented a loose cast of the arterial canal. The inferior extremities of the plugs, in each external iliac artery, did not terminate abruptly, but were continued as a lymphy layer, like a false membrane, over the inner arterial coat, on the right side, for an inch downwards, and on the left for an inch and a half. The femoral and other arteries below were quite healthy, and the veins of the limbs presented no special morbid appearances.

In relation to the preceding case of local arteritis, it is difficult to assign any reasonable cause for the occurrence of the obstructive inflammation. It has been suggested to me that the inflammatory action might have been produced by great pressure upon the vessel from the enlarged pregnant or puerperal uterus. But then arteries do not readily inflame and become obstructed under mere external pressure; and in every puerperal case there is a greater or less

amount of this pressure on the aorta without inflammation and obstruction following.

Perhaps some of the arterial obstructions which I have previously described in the cases detailed under the two first sections, particularly in Section II., may be considered by some pathologists as referable rather to the effects of local arteritis than of plugs of organised or inorganised fibrine carried into the arterial tube from a distance. It is only by watching more carefully the suddenness or slowness of the arterial obstruction as it occurs during life, and by observing and analysing far more carefully than has been hitherto done in our autopsies, the structure of the existing plug and the exact condition of the arterial wall at the point of obstruction, that such a question can be definitely settled.

Section IV.—Arterial Obstruction from Spontaneous Laceration and Corrugation of the Internal Coat of the Artery.

When the internal coat of an artery is divided artificially, as in the forced elongation of arteries under accident—or when it ruptures, as it sometimes does, spontaneously, the divided ends of the lacerated tunic or tunics—for the middle coat may also give way—coil and curl up so as to occlude at once, more or less completely, the arterial canal. The friability and softening leading to spontaneous rupture of the lining membrane is evidently the result of a previous state of disease, in all likelihood of an inflammatory character; and so far, the present group is possibly more truly referable to the last, or to those that are indirectly, if not directly, the consequence of Arteritis.

The first case in which the sudden arrestment of pulsation in an artery during life was traced, by dissection after death, to obstruction of the arterial tube from the spontaneous rupture of its internal coat, was published by Professor John Thomson in Dr. Hodgson's excellent work on *Diseases of the Arteries*, in 1815. Some years subsequently —1829—Professor Turner read a masterly essay on the same subject to the Medico-Chirurgical Society of Edinburgh.[1] He cites ten cases of arterial occlusion.

In one of these ten cases the arterial obstruction occurred in a puerperal patient, but unfortunately there was no *post-mortem* examination instituted to show whether the arrestment of the arterial

[1] See *Transactions* of the Edinburgh Medico-Chirurgical Society, vol. iii. p. 105.

pulsation was or was not the result of spontaneous rupture and corrugation of the lining membrane of the occluded artery. The case is quoted by Mr. Turner from Dr. Parry of Bath, who details it in his work on the Arterial Pulse,[1] in the following words :—

Case IX.—"I have seen the total loss of pulse in one arm, with coldness, but complete power of motion in that part; while the other arm was warm, and possessed a perfectly good pulse, but had lost all power of voluntary motion. These symptoms commenced suddenly, two or three days after parturition. The patient soon died, but a dissection was not obtained."

In 1842, Dr. Oke of Southampton published[2] a case of sudden arterial obstruction occurring in the humeral artery after abortion, which he deemed referable to this "spontaneous rupture of the inner coat of the vessel, and the projection of its edges into the tube."

Case X.—In the autumn of 1831, a patient, æt. 24, during the tenth week of pregnancy had hemorrhage from the uterus. On the following day it was more profuse, and terminated in abortion. The day after delivery she was seized with severe headache, giddiness, dimness of vision, and vomiting. So great was the interruption to the vision, that she could not distinguish the hands of a common clock. The fingers of the left hand felt as though scorched, and were extremely painful. On the following day the dimness of vision continued, and there was intense pain and numbness in the left arm, which at length became cold and insensible to external impression. The wrist and the tips of the fingers were discoloured, especially the tip of the ring finger, which was turning black.

On examination no pulsation could be felt in any of the arteries of the arm above the affected hand, but the subclavian was distinctly felt pulsating above the clavicle. There was no perceptible disturbance of the action of the heart, and no embarrassment of the respiration. This patient eventually recovered, with the loss only, by gangrene, of the integument of the thumb and fingers of the left hand. In three days the power of vision was restored. The pulsation, however, never returned in the obliterated arteries of the left arm, but the arm itself gradually regained its sensibility and ordinary plumpness.

As proof that in this instance the obstruction originated in the affected vessel, and not in any morbid state or lesion of the heart, Dr. Oke, in a letter to me, dated November 30, 1853, observes—"No abnormal action of the heart or its valves could be detected when the obstruction in the left axillary artery took place, nor during my observation of the case subsequently. To make the answer (to your inquiry on this point) more complete, I lately, along with Dr. Lake, made a careful examination of the region of the heart of this patient, who is still living. After listening attentively to its action

[1] *Experimental Enquiry into the Nature, etc., of the Arterial Pulse*, p. 139.

[2] *Provincial Medical and Surgical Journal* for April 23, 1842, p. 51.

at different points, we could not detect any sound that would indicate a vegetated or morbid condition of the valves, nor indeed any other abnormal sound of the organ."

Section V.—Obstruction of the Pulmonary Artery and its Branches, by Morbid Materials coming from the Systemic Venous Circulation, and passing through the Right Side of the Heart.

Hitherto I have spoken only of the puerperal obstruction of arteries belonging to the general or systemic circulation, and produced either by local diseases and lesions in the arteries themselves, or by morbid masses projected into them from the centre to the circumference of the arterial circulation, from the trunk to the branches of the arterial tree, from the cavities of the heart or larger arteries into the canals of the smaller arteries. But we have now to consider an interesting group of puerperal cases of different character, and in which the pulmonary arteries or their branches become blocked up by morbid materials carried forward into them from some part or parts of the systemic veins. In this case the morbid materials, in being carried onward from the points at which they are originally formed in the systemic venous system, to the points in which they become ultimately arrested and lodged in the pulmonary arterial system, necessarily traverse the right auricle and right ventricle of the heart. In the puerperal female two or three different kinds of morbific matter appear thus occasionally to pass from the venous system, and become lodged and accumulated in the divisions of the pulmonary artery—namely, pus, or some of the materials associated with pus, separately or serving as a nucleus for coagulated blood or fibrine; more solid nuclei formed by loosened and detached fragments of those fibrinous concretions that so often fill and obstruct the systemic venous canals of the pelvis, uterus, legs, etc., in puerperal phlebitis; or equally solid portions of fibrine or coagulable lymph, not the result of inflammatory secretion, but made up possibly of the natural plugs by which nature normally shuts up the open orifices and canals of the uterine veins after delivery.

Metastatic lobular pneumonia, originating apparently from the transference and lodgment of pus in the smaller pulmonary vessels and capillaries, is a complication occasionally met with in the phlebitic form of puerperal fever. In the disease, as witnessed by

him at Prague, Dr. Kiwisch tells us that in most cases where the metastatic pneumonia was violent, he found "the *pulmonary arteries* of the diseased lobe usually inflamed as far as their point of exit from the pulmonary tissue, and filled with adherent lymph and pus."[1] Perhaps more minute inquiry may yet prove that such obstructions of the pulmonary arteries are by no means uncommon in the pulmonary inflammations, deposits, and abscesses, which occur in connection with surgical and obstetrical phlebitis.

In the two following cases, described, and one of them delineated above twenty years ago by Professor Cruveilhier in his large work on Morbid Anatomy, the pulmonary arteries and their branches had pus and fibrine lodged in their canals, as a consequence of puerperal phlebitis.[2]

Case XI.—A women, recently delivered, was seized, on the 12th of July 1830, with all the symptoms of uterine phlebitis, which were combated successfully by leeches to the epigastrium and emollient injections. From the 25th July to the 3d of August she appeared quite convalescent, and suckled her infant without inconvenience. An invasion of new symptoms, however, took place at the latter date—namely, oppression, cough, anxiety, nervousness, and extreme frequence of the pulse. She died on the 9th of August, twenty-eight days after delivery. On post-mortem inspection, the uterus was found little above its ordinary size, but the uterine, ovarian, and almost all the hypogastric veins, were like hard cords. They owed this hardness to compact clots filling them, which were adherent and decolorised. The external iliac veins, with the left crural vein and some of its divisions, contained clots less compact and adherent, and evidently of a recent date. At the base of the left lung were found several portions of lobular pneumonia, in the state of red induration, and two superficial purulent patches. There was also œdema of both lungs in the posterior half of the two inferior lobes. Some hard concretions filled the divisions of the pulmonary artery. The lesser branches were filled with red and scarcely adherent clots, while the concretions in the principal trunk were coherent and decolorised. In the centre of the principal clot or plug was a collection of pus, which offered all the characters of phlegmonous matter; farther on the clot or plug was decolorised, and formed a complete cylinder. In this case uterine phlebitis occurred from the 12th to the 25th of July; and from the 25th July to the 3d of August the patient seemed to be recovering, when suddenly, at the latter date, symptoms of pulmonary mischief supervened, under which she sank in six days.

Case XII.—In a woman, who died of puerperal phlebitis two weeks after delivery, and who presented typhoid symptoms during the later days of life, the primitive iliac vein and its divisions were found filled with adherent sanguineous concretions, some of older, others of more recent formation. These concretions were pale in the principal trunks, and contained pus in their centre; they were red, and gradually less and less coherent in the smaller divisions of the vessels. The lower extremities only presented a very slight œdema. The liver was of a yellowish colour, and softened. The uterus was equally soft, but without any other morbid

[1] *Die Krankheiten der Wöchnerinnen*, etc., 1840, p. 116.

[2] *Anatomie Pathologique*, livrais. ii. tab. 1 and 2, pp. 18 and 21.

alteration. There were marks of true recent pleurisy on the posterior border of the right lung, with a combination of ordinary or diffuse and lobular pneumonia on the same side. The tissue of the lung, when divided, presented sections of vessels full of fibrinous concretions. These obstructed canals or vessels were, on further examination, found to be the divisions of the right pulmonary artery. The concretions in the arteries were pale and full of pus at their centre, but as they divided and subdivided with the course of the arteries, they became red and hardly coherent. The concretions in the smaller pulmonary vessels only existed in the neighbourhood of the parts of the lung affected with lobular pneumonia. In the portion of lung attacked with ordinary inflammation, the tissue of the organ was infiltrated with pus, and in the state known under the name of grey hepatisation. The circumscribed patches of lobular pneumonia presented great differences in respect to volume, and the attendant degree of inflammation. In one place there was red induration ; in another place marbled patches of white and red ; in a third pus, infiltrated on the tissue, or diffused in irregular patches.

A case of puerperal obstruction of the pulmonary arteries, very similar to the two detailed by M. Cruveilhier, has been published by Professor Levy of Copenhagen.[1] There were symptoms during life and evidence after death of uterine phlebitis, though not in a severe form ; and the patient died apparently of two consecutive attacks of lodgment of morbid materials in the pulmonary arteries.

Case XIII.—The 19th of February 1853, a primipara was easily confined, and seemed well, with the exception of a catarrhal cough. On the 20th there was pain over the uterus, but it disappeared after the application of leeches. On the 22d it returned with fever and tympanites. On the 24th there was less sensibility, and the fever had diminished. In the evening, however, she had an attack of violent dyspnœa, with painful constriction of the epigastrium, anxiety, dry cough, and a quick pulse. Auscultation discovered nothing but a moist rhonchus, and the symptoms disappeared after bleeding. Convalescence went on favourably until the 3d of March, when, after supper, sudden and acute pain came on in the epigastrium, with oppression, the respiration became anxious and laborious, and death supervened at the end of a few minutes. On dissection Dr. Levy found the two cavities of the right side of the heart and the pulmonary artery, even to its small divisions, filled with a quantity of blood-clots of different sizes, some freshly formed, others older and more consistent, of a greyish red, more or less discoloured ; while others, again, contained a greyish mass, faintly grained, and of a purulent appearance. The walls of the pulmonary artery were slightly tinged. There was nothing in the left side of the heart, but the aorta had four regular insufficient valves. The veins of the uterus contained concrete pus, more especially towards the broad ligaments.

An instance in which puerperal obstruction of the pulmonary artery suddenly supervened during convalescence from phlegmasia dolens, and where, consequently, as in the preceding examples, the pulmonary disease was connected with, and dependent upon, previous phlebitis in the systemic venous system, was published at

[1] See it quoted from the *Deutsche Klinik* into *l'Union Médicale*, Dec. 27, 1855.

Berlin, several years ago, by Dr. Hoogeiveg, in the *Preussische Vereinzeitung* for 1852, p. 52.

Case XIV.—A young woman, three days after delivery of her first child, was attacked with phlebitis of the left extremity which yielded to appropriate treatment. But, during convalescence, she suddenly uttered a scream, fell down, and expired. On post-mortem inspection the left crural vein and its branches were found obstructed with phlebitic coagula, which extended upwards to the junction of the crural and iliac veins. The pulmonary artery was filled with similar coagula. These coagula could be traced into some of the smaller ramifications of the pulmonary artery.

In the following instances of puerperal phlebitis, published in the *Deutsche Klinik*, by Dr. Hecker of Berlin, symptoms of pulmonary distress and death suddenly came on—in one case during convalescence from, in the other during the course of, the phlebitic disease; in both women obstruction of the pulmonary artery or its branches by fibrinous or sanguineous plugs was discovered on dissection; and in both, the description, as given by Dr. Hecker, of the upper ends of the concretions found in the inflamed veins, is such as to show that a portion of it was loose in the tube of the vein, and hence easily capable of being detached and carried forward towards the right side of the heart by the current of the circulation. Virchow has found the upper and floating portions of some of these venous plugs so loose that they were separated by succussion of the dead body. Hence we need not feel surprised at sudden alterations in the positions of the patient, or sudden muscular exertions apparently detaching portions of them, as in the following instances.

Case XV.—A primipara, æt. 31, on the third day after a natural labour, was seized with phlebitis of the left crural vein, followed by œdema of the limb. She so far recovered, however, as to be able to leave her bed on the 20th day, but complained of feebleness and numbness of the foot. On the 29th day, in removing some article from the stove, she suddenly sank down; and although the intellect was clear, there was great anxiety, pallor of the face, pinched nose, gasping, very frequent respiration, a small, depressed pulse, and cold extremities. Notwithstanding all the efforts made to rally her, she sank and died at the end of three quarters of an hour. At the autopsy Dr. Hecker found the left crural vein entirely closed by fibrinous clots, which extended along the common iliac vein to the vena cava. A portion of clot an inch to an inch and a half long projecting into the cava was quite free, and terminated by a conical point. The hypogastric vein was equally plugged on this side. On further examination, the two primary branches of the pulmonary artery were found filled with fibrinous coagula, which reached to their final ramifications. These clots in the pulmonary arteries were nowhere adherent to the walls of the vessel, but had the same appearance as those in the crural vein. There were no morbid appearances traceable in the heart or head.

Case XVI.—A robust woman, aged 30 years, after an easy delivery (on the 1st of October), suffered from severe hemorrhage in consequence of an adherent placenta, which had to be extracted. Her state was satisfactory till thirty-six hours after her accouchement, when she took a rigor, which was prolonged to the morning of the 3d of October, and was succeeded by febrile heat. The uterus was very tender to pressure; the skin hot and dry; the pulse 120; and there was anxiety, feebleness, and violent headache. During the next three days the symptoms became graver, and the pulse rose to 136 or 140. An uterine lymphatitis was considered as probable. On the 6th of October she seemed better, but the great frequency of the pulse still produced serious fears. On the 8th, she reported herself as having passed a good night and felt well. After noon, however, notwithstanding a warning to the contrary, she got up, but immediately fell to the ground, and rose with great difficulty. At the end of an hour and a half she was found sitting at the edge of her bed, and at 4 o'clock seemed dying. Her pulse was thread-like, and difficult to count; her respiration very frequent, 60 to 64 a minute; the face was cold, blue, and bore the appearance of extreme anxiety; her extremities were cold. In a short time she became insensible, and died at half-past ten in the evening. On dissection, small portions of the placenta, according to Dr. Hecker, were found still adherent to the anterior wall of the uterus. In its walls, the lymphatics were filled with pus, and the veins with fibrinous coagula. The left hypogastric veins were obstructed with clots, which extended to some distance into the tubes of the common iliac veins. The heart was normal, but the trunk of the pulmonary artery was plugged by a thrombus or coagulum, extending into its two branches, and capable of being followed far into their ramifications.

In all the preceding instances of obstruction of the pulmonary artery, that obstruction occurred in connection with, and as a sequence of the existence of phlebitis and phlebitic concretions in the uterine, pelvic, or other systemic veins. But sometimes obstruction and occlusion of the pulmonary artery or its branches takes place in the puerperal state, independently of any antecedent venous inflammation in the body. The researches of Mr. Paget, Baron, Dubini, Richelot, and other pathologists, have now accumulated a number of instances in which, in the male and in the non-puerperal female, death has occurred in connection with, if not as a consequence of, sanguineous and fibrinous concretions in the pulmonary arterial system, and when there was no evidence of phlebitis being anywhere present. In two most interesting essays on "Obstruction of the Pulmonary Arteries," published by Mr. Paget in the *Medico-Chirurgical Transactions*,[1] this distinguished pathologist has reported a variety of such cases—none of them in the puerperal female—and has endeavoured to trace the cause of the plugging of the pulmonary arteries, and the formation of coagula in them, sometimes to impediments in front to the pulmonary circulation, as from disease

[1] London *Medico-Chirurgical Transactions*, vol. xxvii. p. 162, and vol. xxviii. p. 352.

either in the lungs themselves or in the left side of the heart; sometimes to coagulation of the slowly moving blood in patients whose hearts and systems were nearly exhausted towards the close of life; in other instances, he inclines to refer the obstruction to inflammation and disease of the pulmonary artery itself; and, lastly, in others again he suggests that the coagulation of blood in the pulmonary vessels may be owing to a morbid state or states affecting the constitution of the blood itself, so as to "increase that adhesion of it to the walls of the vessels which constitutes, even in the healthy state, the greatest resistance which the heart's power has to overcome."

Out of seventeen cases collected by Mr. Paget of obstructing concretions found in the pulmonary arteries after death, in seven death occurred suddenly and unexpectedly. As I have already stated, none of the instances referred to in Mr. Paget's essays occurred in puerperal females. Out of the six cases which I have already given of plugging of the pulmonary arteries in the puerperal state, in four death occurred with fearful suddenness and rapidity. In all these instances uterine or crural phlebitis preceded the pulmonary obstruction. In the two following cases death struck down the patients with the same appalling abruptness; in both there was found, on dissection, the same fatal obstruction of the pulmonary vessels; but in neither of them was there any decided evidence of previous phlebitis, certainly none in the first of the two cases. Could the concretions in the pulmonary vessels be the results—as I have ventured to suggest at the commencement of the present section—of the detachment and transfer by the circulation of one or more of the plugs normally formed in natural labour in the open orifices of the uterine veins after the separation of the placenta, and acting as nuclei for further coagulation when lodged in the pulmonary arteries;—or were these sanguineous concretions a local coagulation of blood produced by the morbid qualities of the blood itself—and similar perhaps in kind to the obstructing coagula which we sometimes find rapidly formed in the tubes of varicose veins? Let me add that I am indebted to Mr. Paget for directing my attention to the two following interesting cases, and I owe to his kindness the notes which I possess of the second of them. Mr. Paget had an opportunity of examining the recent morbid appearances in both of these instances, and I have his authority—the greatest I could quote on such a question—for stating that he believed the immediate cause of death in both patients was the mechanical obstruction of

the pulmonary arteries, and that in both instances the concretions in the pulmonary arteries had, as appeared from their anatomical structure, been formed before death.

Case XVII.—The patient,[1] a lady æt. 34, was confined of her second child on the 18th of August 1851. Her labour was easy and natural, and she made a tolerably good recovery up to the 30th ; by this time moving about and apparently in good health and spirits. On that day, however, while dressing, she fell on the bed ; the nurse observed frothiness at the mouth, and slight convulsion of the face. She spoke feebly once, then laid herself back and died ; the whole circumstances occupying but a few seconds.

At the post-mortem examination, the muscular structure of the heart was found pale and thin, especially that of the right ventricle, which contained some dark blood. Each of the pulmonary arteries contained a clot of blood, nearly filling the calibre of the vessels. The chief clots were about an inch and a quarter in length, mottled and firm, and in some instances slightly adherent to the side of the vessel. In tracing the divisions of the pulmonary artery, numerous other clots were found of the same character as the larger ones, and they extended even into the smaller ramifications of the vessels.

The following analogous case occurred in the practice of Mr. J. H. Hewer, and I give the account of it in that gentleman's own words.

Case XVIII.—Mrs. ——— was safely confined of her third child on July 4, 1853, and continued remarkably well until eight days after that time. On the afternoon of the eighth day, at two o'clock, she was seen by her medical attendant, who found her very well, and in excellent spirits. A little before 5 o'clock she complained of a slight pain in one of her hips, which she attributed to having remained rather long in one position. She obtained relief from sitting up, and then used some little exertion in passing urine. As she was returning to the recumbent posture, the nurse observed her face become suddenly pale, and she turned her head round with a most painful expression of countenance, and said, "O nurse, I am dying!" The nearest medical man was summoned, who arrived in ten minutes after the first signs of danger. He found her pulseless, very pale, and breathing with difficulty. She was quite sensible, and in this state she remained to the time of her death, which took place in about 35 minutes from the commencement of the attack.

She had always enjoyed excellent health, with the exception of slight derangements of digestion, which were referred to a sluggish liver ; she was rather stout, and a very hearty person.

In the examination, 24 hours after death, nothing unusual was observed about the exterior of the body. All the internal organs were healthy, except that the liver was rather large, and a few small gall-stones were present in the gall-bladder. The heart appeared healthy, although its muscular tissue was thought rather pale. The

[1] This case has already been published by Mr. Havers, in the *Medical Times and Gazette* for February 1852, p. 161.

pulmonary arteries were distended with firm, hard, cylindrical coagula. No other vessels contained clots. The vena cava inferior was empty and collapsed. The pulmonary arteries were healthy in structure; their coats smooth and without earthy deposit. The clots in them were firm, laminated like those in an aneurismal sac, but not closely adherent to their walls. The external layers appeared most firm; the interior being darker, softer, and apparently of a more recent date.

It was ascertained, after the examination, that before the patient's confinement, her left thigh and leg had been greatly swollen. This swelling had gradually subsided after her delivery, and at death there was no apparent difference of size in her lower extremities.

The occasional occurrence of sudden and unexpected death in the puerperal mother is a subject which has engaged the attention and pen of various obstetrical pathologists, as Drs. Denman, Chevalier, M'Clintock, Robert, and others. Different causes lead to it in different cases. Sometimes it is apparently the result of the entrance of air into the circulating system through the open orifices of the uterine sinuses, as in the cases described at p. 503, and in instances reported by Bessems, Wintrich, Berry, etc. I have seen one case where hepatic abscess ruptured into the peritoneum by the efforts of labour, and speedily destroyed the patient; and another where abdominal bleeding from peritoneal fissures on the uterus rapidly led to the same result. Diseased heart, especially disease of the mitral valve, with ventricular dilatation, sometimes seems to produce sudden death after delivery, especially upon moving; and simple "shock," "syncope," and "idiopathic asphyxia," have all been severally brought forward as possible or probable explanations of this appalling occurrence. All such cases and causes, however, evidently require to be reinvestigated, with a view of ascertaining whether the more palpable condition illustrated by the preceding instances, is not in truth the origin of many examples of this frightful complication—viz. obstruction of the pulmonary artery, or its larger branches.

It requires, however, to be noted, that obstruction of the pulmonary arteries sometimes proceeds to a very great extent, without producing any necessary tendency to sudden dissolution, particularly if the obstructing concretions have gradually accumulated, and only successively invaded one division of the pulmonary vessels after another, as in Cases XI. XII. etc. Under these circumstances there

may be set up, as Mr. Paget has shown, a mutual adjustment between the decreased quantity but increased velocity of the blood sent through the partially occluded pulmonary circulation, and the diminished volume and rate of the circulating fluid in the systemic circulation. Every new amount of occlusion, however, adds to the danger of the patient; and when at last the obstruction has become very extensive, death in some cases supervenes suddenly, under muscular exertion or movement, but less perhaps from true asphyxia than from true anæmia of the left side of the heart and brain, or want of blood in the systemic circulation; while in other instances, dissolution very early and rapidly ensues from the obstruction in the pulmonary artery or its larger branches being at once so great as to produce complete and fatal arrest to the flow of blood through the pulmonary artery or its larger subdivisions, a result which is probably also sometimes produced by large obstructing coagula forming in and filling up the right cavities of the heart itself.

In 1849, Dr. Meigs published, in the March number of the *Philadelphia Medical Examiner*, an ingenious and suggestive paper on sudden death, after delivery, from "heart-clot." In this communication, Dr. Meigs argues that white fibrinous coagula of blood or polypi are occasionally apt to form in the right auricle and ventricle, in consequence merely of great hemorrhages, attended or complicated with syncope (states, both of which predispose to sanguineous coagulation), and that these coagula or polypi may afterwards augment in size around an original small nucleus, and at last fatally obstruct the flow of blood through the pulmonic side of the heart. He only gives full details of one case, and in it the coagulated fibrine stretched from the distended and obstructed right auricle and ventricle into the pulmonary artery and its principal branches.

Case XIX.—A lady, after the birth of her fifth child, had post-partum hemorrhage to the extent of about thirty ounces. On visiting her next day, her medical attendant found her quite well in every respect, and the pulse at 75. She was taken out of her recumbent position and placed upright in bed, when she became suddenly ill; and only three hours after his morning visit, her physician was again summoned to see her in a most distressed and apparently dying state, with the pulse at 164, very feeble and thread-like, the hands cold, and the respiration violent and irregular. Auscultation of the heart disclosed a feeble impulse, with great irregularity of the systolic action. There was thoracic pain or angina on respiration; but no pain or anything anormal in the condition of the abdomen. She continued to survive for forty-eight hours more, suffering during that time inexpressible respiratory distress. On post-mortem examination, the right auricle and ventricle and the auriculo-ventricular opening were found—to use Dr. Meigs's own words—"completely tamponed with a clot, which consisted

apparently of a firm, whitish-yellow mass of fibrine, out of which every particle of hæmatoglobulin had been washed away or expressed." The pulmonary artery, he tells elsewhere, was in this case also obstructed or "tamponed with a cylindrical clot, extending several inches along the vessel and its principal branches" (p. 145).

Causes of Arterial Obstruction and Inflammation in the Puerperal State.

If there happened to exist on the cardiac valves old pediculated vegetations, capable of being readily separated, an increased force in the current of the circulation may at any time detach them. The excitement of the circulation occurring during the exertions of parturition, might, *a priori*, be supposed to be calculated to accomplish their separation. But in only one of the preceding cases (Case VII.) did the arterial obstruction occur during or shortly after labour; and in that instance the obstructing agent was probably not a detached cardiac vegetation.

The liability to arterial obstruction and inflammation in the puerperal state must be, therefore, traced—if traceable at all—to other conditions. These conditions will probably be found in certain peculiarities in the blood of the puerperal female, or in certain morbid states which these peculiarities predispose to and produce.

The occurrence of endocarditis and consequently of endocarditical vegetations, concretions, and coagula, is observed principally in connection with morbid states of the system in which there exists a vitiated condition of the blood. The two pathological states, however, with which endocarditic as well as pericarditic lesions are found most frequently combined,[1] are—1, acute rheumatism; and, 2, the more chronic forms of Bright's disease—two diseases which all modern medical authorities acknowledge to be complicated with, and attended by, if they do not actually consist of, certain morbid states or alterations of the constitution of the circulating fluid. In these two diseases acute rheumatism and chronic albuminuria, the

[1] In an admirable paper on *The Causes of Pericarditis*, etc., published by the late Professor Taylor in the London *Medico-Chirurgical Transactions*, vol. xxviii., that accomplished pathologist shows, from the analysis of an elaborate series of cases and data, that acute *Endocarditis* is principally seen in connection with acute rheumatism and chronic albuminuria, and occurs in about 8 out of every 100 cases of acute rheumatism, and also in about 8 out of every 100 cases of chronic Bright's disease (p. 559); whilst in the subjects of these two diseases, evidence of recent as well as *old* Endocarditis (as indicated by valvular lesions) is found in nearly a half of all those affected (p. 560).

morbid state of the blood is no doubt specifically different, but, at the same time, in several respects analogous; and hence the analogous tendency in both affections to the occurrence of endocarditis and other internal inflammations. In both of these affections, under certain conditions and stages, the blood, as taught us by chemical pathologists, contains special irritating principles in the form of morbid matters (urea and probably lactic acid) accumulated within the circulating system from want of due depuration or excretion. In chronic albuminuria, as in acute rheumatism, there is generally, also, according to Simon and others, an increase of serum and a diminution of blood globules.[1] Further, in acute rheumatism the quantity of fibrine is usually much increased; and the same is true of acute albuminuria, but not of the chronic forms of the disease, except when some of the inflammations liable to be produced by the disease—such as endocarditis, pleuritis, etc.—spring up when the quantity of fibrine rapidly rises, and a temporary state of hyperinosis or excess of fibrine is engendered.

Among the list of cases of arterial occlusion and inflammation in the non-puerperal state which have been recorded by Virchow, Ruhle, Paget, etc., several had been suffering previously, or at the time of the arterial obstruction, from some form of febrile disturbance, and hence of blood disease; most were the subjects either of rheumatic complications or of chronic renal disease. Thus in two out of Ruhle's three cases of obstruction of the cerebral arteries, acute rheumatism existed. In three out of five cases of obstruction of the pulmonary artery by old clots observed by Mr. Paget, the patients had Bright's disease of the kidney.

But if such blood diseases as rheumatism and albuminuria give a tendency in the non-puerperal condition to endocarditis and to arterial concretions and inflammation, we cannot wonder that similar arterial lesions should occasionally occur in the puerperal female—for the constitution of her blood is temporarily changed even under normal circumstances at the time of delivery, and often becomes much and morbidly changed under the anormal circumstances to which she is then liable to be exposed, so that its characters are more or less assimilated to the characters of the same fluid in the subjects of acute rheumatism and chronic albuminuria.

The analyses and investigations of Becquerel, Regnauld, Kiwisch,

[1] See the analyses by Drs. Andral, Gavarret, Christison, etc., in Simon's *Animal Chemistry*, vol. i. pp. 273, 323, etc.

Cazeaux, and others, have shown that during the last weeks of pregnancy there is, as in acute rheumatism and chronic albuminuria, a diminution of the red globules of the blood, an increase of serum, and a marked state of hyperinosis or excess of fibrine. According to the researches of Gavarret and Delafond, this redundancy of fibrine not only appears to remain after parturition, but tends even for a time to increase—giving, doubtlessly, among other causes, a predisposition to obstruction and inflammation of the containing vessels, whether arteries or veins. Besides, the constitution of the blood in the puerperal female is altered in other ways. The retention and accumulation of matters destined for excretion—as urea and lactic acid—are supposed to give that tendency to internal inflammations, which is possessed by rheumatic and albuminurious blood, these retained excretory matters probably producing the inflammations in question, by being—by a kind of perverted secretion—thrown out upon surfaces, or into tissues which are directly excited into inflammation by their presence as stimulating and irritating matters. During the puerperal condition, the blood is more loaded with new materials, intended, some for excretion, and some for secretion, than at any other term of life ; and hence is specially liable to diseased changes under the superaddition of any exciting or septic causes. For the uterus, during the first weeks after delivery, is becoming involved and absorbed by a kind of retrograde metamorphosis, and the effete materials resulting from its disintegration necessarily first pass into the blood before they are ultimately discharged and depurated from the system ; there is an excretory action going on in its interior in the form of the lochial discharge ; and the elements for the formation of a new and important secretion—the milk—are present in the circulation.

But under various accidental causes, or by the supervention of fever, under exposure to cold, from indiscretion in diet, etc., the normal discharge of these natural puerperal excretions and secretions is not unfrequently impeded or arrested ; and the blood becomes morbidly altered and diseased from their retention or non-elimination. Besides, morbid matters sometimes pass into the circulation in the puerperal state through the uterine veins, etc., more particularly pus or some of the elements of pus, and afterwards are carried round with the circulating mass. Some of these new or non-eliminated materials appear occasionally to have a direct tendency to produce coagulation or consolidation in the super-fibrinated and diseased blood, as is seen experimentally when particular varieties

of pus are mixed with it; while others of them have a greater or less tendency to irritate, and produce changes upon the lining membrane of the vascular system, ending in obstruction and inflammation of the veins (phlegmasia dolens); or in obstruction or inflammation of the arteries; or, as in Cases I., II., etc., in simultaneous or successive obstruction and inflammation of both individual arteries and individual veins in the same patient. If the cardiac valves or endocardial membrane has been in previous periods of life, as in some of the other cases detailed in Section I., the seat of inflammation and consequent vegetations, such *diseased* parts and excrescences will, in accordance with an acknowledged pathological law, be more liable than any other more healthy and normal part of the interior of the circulating system to take on a renewed inflammation under these renewed inflammatory conditions; and when these parts, and the pedicles by which the vegetations are attached to them, are attacked and rendered friable by inflammatory action, the common force of the blood-current may be sufficient at last to detach and separate one of them, or a succession of them. There seems some ground also for believing that, occasionally in a protracted puerperal convalescence, as in Cases II. and V., the endocarditis and resulting endocarditic vegetations may both form and separate after delivery, the detached vegetations being recent, and not of old standing; and perhaps, when obstetricians have studied more accurately the liability of the puerperal female to endocarditis and pericarditis, they may come to acknowledge, with Testa, one or more forms of puerperal carditic inflammation.[1]

Symptoms of Puerperal Arterial Obstruction.

I. In the arteries of internal organs.

The symptoms of arterial obstruction necessarily vary with the artery obstructed, or rather, to speak more correctly, they vary with the function of that part to which the artery belongs, and hence are more or less severe and serious, according as the function of the affected part is important or not in the economy. The results in this way of arterial obstruction are very different, according as the occluded artery belongs to organs connected with the head, chest, or abdomen, or is an artery belonging to one of the extremities of the body.

The immediate symptoms of arterial obstruction are occasionally

[1] See his work, *Della Malattie del Cuore*, tom. iii. p. 178, Capo ix. "Delle Pericarditi et delle Idropericarditi puerperali."

modified also by the slowness or suddenness with which the obstruction is produced, and by the fact whether the stoppage in the artery or arteries perfectly or imperfectly shuts off the flow of blood to the parts beyond, and thus perfectly, or only imperfectly, interferes with and paralyses the function of that part. Thus, when a cardiac vegetation, displaced from the heart, is suddenly carried upwards, as happened in Case IV., and in other instances, into the middle cerebral artery, the function of the portion of brain supplied by that artery seems, in general, at once suddenly disturbed or totally arrested—the part supplied by the middle cerebral artery having little or no anastomoses with the neighbouring cerebral branches. In the instance in question—Case IV.—there was sudden loss of innervation, or hemiplegia of the opposite side of the body, followed by the symptoms of ramollissement or gangrene of the implicated portion of brain; and the nature of the disease and the lesion were correctly diagnosed by Dr. Burrows on his first visit to his patient, from his finding, 1st, sudden hemiplegia supervening in a comparative young patient, who presented at the same time, 2dly, auscultatory signs of cardiac valvular disease or endocarditis.

The history of other cases of obstructed cerebral arteries shows, however, that the resulting paralysis and other nervous symptoms may sometimes come on more slowly, especially when the arterial obstruction from an impacted concretion is not complete at first, but only becomes completed from coagula collecting round this concretion as a nucleus; or when the obstruction occurs more slowly from disease of the coats of the implicated vessels themselves.

It is possible that the complete occlusion of a single artery by a vegetation, or concretion thrown into it, may destroy entirely the function of an individual organ, when that organ depends for its function on a single artery. In his large work on *Diseases of the Heart*, Testa dedicates a chapter to blindness as a complication sometimes seen in cardiac diseases (tomo ii. capo ix. p. 132). Corvisart describes a case of sudden dissolution of the right eye, without any preceding or accompanying inflammation, or any appearance such as we see in phlebitic ophthalmia, occurring in a patient suffering under cardiac inflammation. "The most careful examination," observes Dr. Stokes, when speaking of this case, "failed to detect any cerebral disease, and the sudden dissolution of the eye remains an unexplained fact."[1] The fact, however, appears not inexplicable upon the idea that a small fibrinous concretion or plug had passed upward

[1] Stokes on *Diseases of the Heart and Aorta*, p. 59.

out of the cavity of the inflamed heart, and lodged in and occluded the ophthalmic artery. Of course, the truth of such an explanation can only be ascertained by examining the state of the artery in any similar case. Several years ago I saw the destruction of an eye in a puerperal patient, which I have sometimes thought might possibly belong to this form of disease.

Case XX.—A patient, six weeks after delivery, walked some distance to my house to show me her right eye, which was quite blind and opaque, but the case differed from Corvisart's in this respect, that the eyeball was distended with purulent matter. A fortnight subsequent to her accouchement, on making some unusual muscular exertion, pain suddenly came on in this eye, which had been weakened during an attack of measles in childhood. Inflammation speedily followed. When I saw her, there was no constitutional disturbance, such as we see in cases of puerperal phlebitic ophthalmia—a disease that is almost always, if not always, fatal. I have lately seen this patient with the eye quite collapsed and atrophied. She has an irregular pulse, and other symptoms of old disease of the heart.

Of the symptoms of obstruction in the arteries of the abdomen and chest we know in pathology, as yet, little or nothing.

The cases which I have described under Section V. of obstruction of the pulmonary artery show that the patients upon whom this obstruction is found after death suffer during life under symptoms indicating distressing disturbance in the actions of the heart and lungs. The first symptoms in some appear to have been sudden pain or angina in the region of the heart, with faintness, palpitation, and afterwards great increase in the rapidity of the pulse. The respiratory symptoms have mostly consisted of laboured, anxious, and irregular breathing, particularly on the least movement; with sometimes the addition of cough and frothy or bloody expectoration. There occasionally breaks out a cold perspiration on the surface, and there is often a marked and deadly coldness of the hands or other extreme parts of the body, with congestion of the face. In one or two cases, temporary unconsciousness, or delirium, or a convulsive fit, have been observed; and in others, great nausea and vomiting have formed early symptoms. If such symptoms of cardiac and pulmonary suffering suddenly supervene in a puerperal patient, especially after change of position or exertion, and more particularly when recovering from any form of phlebitis, we might have reason to suspect obstruction to a greater or less extent of the circulation in the pulmonary arteries. Hitherto auscultation has not enabled pathologists to make out any special signs indicative of the existence of obstruction in the pulmonary artery; and indeed the

sudden supervention and presence of such severe cardiac or pulmonic disturbance *without* any corresponding stethoscopic signs, forms in itself, perhaps, one of the best tests of the lesions consisting in some occlusion in the pulmonary vessels. These symptoms, in some instances, have, as I have already stated, been observed to come on slowly, in all probability from the obstruction in the pulmonary arteries only gradually increasing and accumulating. When the occlusion at last reaches the larger pulmonary arteries, or shuts up their canals from the first, death, as we have previously seen, comes on with unusual rapidity and suddenness.—(See Cases XIII. XIV. XV., etc.)

Gangrene of the lung, with its characteristic fœtor, sometimes comes on in the puerperal, as in other states, without any adequate amount or intensity of preceding inflammation, and sometimes, indeed, the "inflammation," to quote the words of Lænnec, "surrounding the gangrenous spot seems to be rather the effect than the cause of the sphacelus." Is the gangrene in such instances not sometimes an effect, and hence also a symptom, of the obstruction of the pulmonary, or rather of the bronchial arterial branch supplying the sphacelating part, and is not pulmonary gangrene, like the gangrene of the extremities, frequently the consequence of arterial obstruction?

Perhaps some instances of impeded and arrested function, gangrene, etc., in the abdominal viscera, may yet be found to admit of a similar explanation. Dr. Abercrombie pointed out a remarkable series of fatal cases of ileus, in which apparently there existed merely paralysis of a limited portion of the intestinal canal, in consequence of which loss of muscular power, that portion did not act in concert with the other parts of the tube, and the non-transmission of the intestinal contents was the result. In these cases of paralytic ileus, there was usually violent pain during life; and on dissection the paralysed portion of bowel was found in some instances white and discoloured, in others livid, and in one instance gangrenous, but without any appearances of inflammatory exudation.[1] In the remarks which I have to make immediately upon the symptoms of arterial obstruction as seen in the extremities of the body, we shall find that in the limbs arterial plugging and occlusion gives rise to these same various effects, paralysis, pain, and occasionally gangrene. If arterial obstruction produces similar

[1] Abercrombie on *Diseases of the Stomach*, etc., 2d. edit. pp. 143-144, Cases 25, 26, 27, 28, etc.

effects internally to those which it thus produces externally, would not the plugging of a mesenteric artery, or of some of its branches, give rise to the symptoms and consequences seen in the paralytic form of ileus described by Dr. Abercrombie? The whole subject, however, of the pathological signs and results of the obstruction of the arteries supplying the internal organs of the body, is as yet so unknown and uninvestigated, that speculating on the matter is mere hypothesis.

II. SYMPTOMS OR EFFECTS OF OBSTRUCTIONS SEATED IN THE ARTERIES OF THE EXTREMITIES.

The symptoms, however, of arterial obstruction have hitherto been principally observed and studied as they are met with in occlusion of the arteries of the extremities of the body. These obstructions are generally preceded in the puerperal female by more or less febrile and constitutional symptoms, and occur especially in patients who are suffering or have suffered from rheumatic or other diseases of the heart and cardiac valves. When arterial obstruction at length takes place in one or more of the vessels of a limb in patients presenting these predisposed states, the following local symptoms are liable to occur in the obstructed limb—viz., 1st, Arrest of the pulse below the site of obstruction; 2d, Increased force of pulsation in the artery above this site; 3d, Change in the temperature of the affected limb; 4th, Paralysis, or neuralgia in it; 5th, Gangrene. Let me speak briefly of some of these symptoms of puerperal arterial obstruction and inflammation in succession.

1. *Arrest of the Pulse below the site of Obstruction.*—The arrest of the pulse from a point in the course of the artery of a limb downwards may supervene suddenly, as when the arterial obstruction is produced by a vegetation or coagulum carried from a distance and impacted in the canal of the vessel; or the pulsation may cease gradually, as when the obstruction is produced more slowly by the presence of a local arteritis. In practice, physicians are seldom in the habit of examining any artery, except the radial; and hence probably the cause why arterial obstruction has been more frequently found in the arm than in other parts during life. In any doubtful case, especially where there are any other symptoms of obstruction present in the lower extremities, as neuralgia or partial paralysis, it is our duty to examine the course of the arteries in that extremity, in order to ascertain whether at any point the pulse is obstructed

in them. It is necessary also to remember, in relation to this symptom, that after a time the pulse may return in an artery previously obstructed, as happened in Cases I., etc.

2. *Increased Force of Pulsation in the Artery above the site of Obstruction.*—Though absent in some instances, this symptom has been well marked in a few others. Thus, in a very important case described by Mr. Tufnell,[1] and in which the popliteal artery was occluded by cardiac vegetations impacted in the canal of the vessel, there was such strong pulsatile action in the femoral artery above the site of obstruction, as at first to suggest the idea of the possibility of aneurism, but there was no aneurismal bruit de soufflet present. This symptom may even serve us in the diagnosis of the obstruction of some internal arteries. In a case of puerperal hemiplegia, which I saw with Dr. Alexander, this symptom, with others, led me to suspect the probable occurrence of impaction of a cardiac vegetation or concretion in one of the cerebral arteries.

Case XXI.—The patient was the subject of old-standing disease of the mitral valve, and considerable hypertrophy of the heart. About the eighth month of her pregnancy she returned home from a long walk scarcely able to articulate, and with commencing symptoms of hemiplegia in the right side. There was no albuminuria. During the course of the next twenty-four hours these paralytic symptoms increased in intensity, and the arm and leg became gradually more powerless, so that the leg at last did not answer to the reflex irritation of tickling the sole; the hand was spasmodically shut. At the same time the patient evidently retained completely her consciousness and mental faculties, though quite unable to give utterance to her wishes and feelings. There was no tendency whatever to stupor, and no febrile reaction. On feeling simultaneously, with the fingers of the two hands, the left and right carotids, the amount of pulsation in the artery on the left side was found by Dr. Alexander and myself greatly stronger and more marked than the pulsation of the corresponding vessel on the other side of the neck. The patient went on in much the same state to the full time, and was safely delivered. The hemiplegia had decreased since that period, but still—now three years since the attack—the power of articulation remains much impaired, and the right leg and arm are feebler than the left.

If the hemiplegia in this instance had been the result of sanguineous effusion into, or other lesion of, the left hemisphere of the brain, and not the result of arterial obstruction in one of the arteries supplying that hemisphere, would there have been this extraordinary impulse in the left carotid artery? I am not aware that pathology yet possesses facts and observations to answer the question definitely; but reasoning *a priori*, one would expect it to be answered in the negative. And if this case be an instance of hemiplegia from arterial

[1] *Dublin Quarterly Journal of Medical Science*, vol. xv. p. 371.

obstruction, it is invested with this additional interest, that it affords us evidence of the possibility of partial recovery at least, from this variety of encephalic lesion.

3. *Fall in the Temperature of the Limb.*—When the artery or arteries are obstructed in a limb, a fall in the temperature of the extreme parts of the limb usually soon follows. A morbid feeling of heat is sometimes complained of by the patient in the first instance; but the application of the hand, and still more of the thermometer, certifies, in general, an actual and sometimes a considerable fall. The extent of this diminution of temperature is regulated by the extent and completeness of the obstruction to the supply of arterial blood in the limb.

4. *Lesions of the Motory and Sensory Powers in obstruction of the Arteries of the Limb.*—Paralysis—Neuralgia, etc.—The functions of sensation and motion in limbs, in which the arteries have become obliterated, are very differently affected in different instances. These differences depend upon the degree of arterial obstruction that is present, and upon some collateral circumstances. The amount of blood sent to the obstructed part may be sufficient for maintaining the mere purposes of its vegetative or nutritive life, but not sufficient for maintaining in it, in their normal state, the higher functions of sensation and motion pertaining to its nerves, or the irritability of its muscles. The production of paralysis in the two posterior extremities in animals, by ligature of the aorta, and in individual limbs by tying and obstructing the principal arteries of these limbs, has been proved experimentally on the lower animals by Stenson, Arnemann, Englehart, Segalas, and other physiologists; and similar results are observed in operative surgery on the human subject—the power of motion being wholly or partially lost till the collateral circulation is developed. Treviranus and Müller infer that the resulting paralysis of muscular motion in the obstructed limbs is referable in these experiments and operations to the muscular fibres being deprived of their requisite constant afflux of arterial blood. In some of these experiments and cases, however, there is evidence of the arrested flow of blood influencing directly the functions of the nerves of the limbs, as a state of cutaneous anæsthesia is observed along with the paralysis. In many cases of arterial obstruction, another effect, more difficult of explanation, presents itself, namely, pain or neuralgia in the implicated limb—a result sometimes temporarily seen, though seldom to a very marked degree, after the ligature and obstruction of vessels for

aneurism. In practice we find very various degrees and combinations of these motory and sensory lesions in extremities whose arteries are the seat of obstruction. Thus—

First, When the arterial obstruction is sudden and complete, the limb may at once be found perfectly paralysed, both in relation to motion and sensation, as happened in the famous case in which Sir Astley Cooper first threw a ligature around the aorta. In a case of arterial paralysis of the leg, mentioned by Cruveilhier, the limb was from the first in a state of death, or, as he terms it, "cadaverisation," and totally without feeling or movement.

Local arterial paralysis, let me here add, differs in one or two important diagnostic points from cerebral or nervous paralysis. In the arterial paralysis there is a want of those head symptoms, that generally precede or accompany all paralyses that arise from lesions of the central organs of the nervous system. The temperature of the limb is commonly diminished in arterial paralysis; but not, at least in the first instance, in cerebral or nervous paralysis. In the former variety of paralysis, there is an arrest of pulsation in the arteries of the affected limb; but the arterial pulsations are not influenced or changed in the latter variety of the disease. In arterial paralysis, gangrene sometimes speedily supervenes; in nervous or cerebral paralysis, this result is unknown.

Secondly, In cases in which the arterial obstruction in the extremities is not complete, the accompanying lesions of innervation sometimes only amount to a feeling of numbness, or prinkling and stiffness or semiparalysis in the implicated limb, like that occasionally produced by pressure on the sciatic nerve in sitting. Usually there is pain, and, at all events, tenderness on pressure, at the site of obstruction, and more or less along the course of the occluded artery. But—

Thirdly, In connection with arterial obstruction in a limb, there has now been also often observed a feeling of extreme pain and tenderness on pressure, not only at the site of occlusion, and along the course of the obstructed vessel, but more or less throughout the extremity; and this increased supersensibility often amounts to a true and severe arterial neuralgia, that may be either constant or intermittent in its type. Sometimes the pain or neuralgia accompanying arterial obstruction is combined with paralysis of the motory powers of the limb; sometimes, as in a case of arterial obstruction and gangrene in the right leg, recorded by Drs. Graves and Stokes, the ultimate paralysis of motion and sensation in the limb is pre-

ceded by pains; and in other instances the arterial neuralgia is excessive, and without any accompanying paralysis having at least been remarked. This pain is occasionally the first, and throughout the most prominent symptoms in arterial obstruction. In a case which lately occurred in the practice of my friend Dr. Paterson of Leith, and where at last gangrene attacked the two lower and one of the upper extremities in a lady of thirty years of age, who was the subject of chronic valvular disease, the first symptom observed consisted in sudden and excruciating pain or neuralgia in the leg first affected, and which wakened her out of sleep in the middle of the night. In any instances in which arterial obstruction is probable, this occurrence of sudden neuralgia is in itself a circumstance to awaken suspicion, and lead to a careful examination of the arteries of the limb. M. Legroux was attending on a patient complaining of great pains in the lower extremities. The means of relief which he had employed having totally failed, several physicians were called into consultation. They all believed the pains to be rheumatic. After the consultation was finished, M. Legroux revisited the bedroom of his patient, examined for the first time the arteries of the affected limb, and discovered that both femoral arteries were hard, tender, and without pulsation. After the patient's death, the lower end of the aorta, the iliac, and crural arteries, were found obstructed by concretions.[1]

The proximate cause of the pain or neuralgia accompanying arterial obstruction in a limb, is a point which, in the present state of our knowledge, it is difficult or impossible to determine. It is not the result of a puerperal neuritis in the affected limb; for, in the right leg of the patient in Case II., the neuralgia was very great during life, but the nerves, on dissection after death, were found quite sound. Nor is it essentially the result of arteritis; for the pain has often developed itself before any arterial inflammation could be established, as immediately upon the artery being obstructed by a vegetation or clot; or, as has been seen in surgery, sometimes instantly after perchloride of iron, etc., was injected, and had produced coagulation of the blood in the vessel. Perhaps the proximate cause of the attendant pain may yet be traced to pressure in some form; or to morbid over-distension of the arterial tube; or, possibly, in some instances to a spasmodic contraction of the walls of the vessel upon its contents.

[1] Cruveilhier's *Traité d'Anatomie Pathologique*, tom. ii. p. 299.

5. *Gangrene below or beyond the seat of Arterial Obstruction.*—In several of the cases which we have previously detailed of puerperal arterial obstruction and inflammation, gangrene of the parts beyond the seat of obstruction followed to a greater or less extent. The cerebral ramollissement and disintegration observed in Case V., in the parts of the brain supplied by the obstructed middle cerebral artery, is in all probability of this pathological nature. The parts of the brain supplied by that artery are, as we have already stated, the more likely to become dead and gangrenous, in consequence of its occlusion, seeing there is little or no anastomosis between its branches and those of the other cerebral vessels. The occlusion of an artery going to some part may interfere with the function of these parts without leading to gangrene. We can easily suppose, for instance, the artery of the retina occluded, with the destruction of the function of vision, without the eyeball or its appendages running any risk of destruction or gangrene, because these parts are nourished by other vessels. When the chief artery or arteries of one of the extremities is obstructed, gangrene frequently comes on, not as a primary, but as an ultimate symptom and result; and its supervention appears to be regulated by various pathological circumstances. It is seldom that the local obstruction of the leading artery alone of a limb leads to gangrene in the extreme parts of that limb; the collateral circulation, if left free, being usually sufficient to prevent any mortification. In fact, the obliteration of the main artery of a limb seldom, apparently, produces gangrene, unless it be combined and co-exist with conditions that more effectually prevent the circulation in the extremity; such as the simultaneous obstruction of the usual channels of the collateral circulation above, or of the smaller arteries of the limb below; or the simultaneous obstruction of the principal vein or veins, as in the left limb of Case II.

Gangrene, in one or other of the extremities of a puerperal female, is the only sign by which we know that arterial obstruction has in all probability occurred, in instances where there has been no opportunity of making an accurate post-mortem examination. I have notes of two or three unpublished cases of gangrene of the extremities in puerperal women, which I may here quote both as additional evidence of the frequency of arterial obstruction, and of this additional complication. The three following cases are all, besides, remarkable for the rapidity with which the mortification supervened. For notes of the two first I am indebted to Dr. Cowan; the third was seen by Dr. Reid of Kirkcaldy.

Case XXII.—Mrs. G——, æt. 36, healthy and active, was delivered of her fourth child some time in the spring of 1826. She was visited regularly for three days, and during this time no bad symptoms were observed; and the lochial and lacteal secretions were natural. Dr. Cowan was sent for early in the morning on the fourth day, and found that his patient had suffered from a severe rigor in the night. The countenance was anxious and distressed, the face pale, the eyes sunk and languid, and she was screaming from excruciating pain in the left leg and foot, but referred principally to the upper and inner portion of the calf, which was found cold and tense, but not increased in size. This state extended to the foot, on the fore-part of which a large spot of ecchymosis appeared most evident over the metatarsus, and creeping upwards to the ankle-joint. The uterus was not perceptibly larger than usual, but there was some tenderness in the left hypogastrium on pressure, as also in the lumbar region. The pulse was small and rapid, the thirst urgent, and the tongue dry and coated. There was some nausea, but no vomiting. The lochia had ceased, and the milk was scanty. On returning in the evening, Dr. Cowan found that the pain was mitigated, but her appearance was worse in every respect. The pulse was now very feeble, the tongue parched and of a fiery red hue; her mind was sluggish and wandering; the discoloration had reached the rise of the calf of the leg (having a wavy margin), and still advancing upward with the same cold, tense, unyielding character, but with little increase of bulk. The thigh seemed natural, but colder than the other. The bowels had been moved with oil, but little or no urine was secreted. At seven o'clock the following morning everything was found worse, and in addition vesication had begun on the spot first discoloured; in short the foot was hopelessly gangrenous and the patient sinking fast. Death put an end to her sufferings early on the fourth day of disease, and the eighth from delivery. No decided margin of arrest in the livid or gangrenous limb could be observed, but the foot showed marks of decomposition, and the smell was characteristic both before and after death. The post-mortem examination was refused.

Case XXIII.—A patient aged 25 years, ten days after delivery with her first child, was seized with gangrene of one of the lower extremities. Dr. Cowan saw nothing of the case until he entered the room at the time of the operation for the removal of the limb. He had no opportunity of making an examination of the state of circulation in the heart and arteries. Above the site of the gangrene the thigh seemed paler than natural, but little altered in size. The gangrene involved the foot and leg nearly to the knee-joint; the patient was greatly exhausted and anxious, but not suffering severely. The limb was amputated at the lower third of the thigh, but not a drop of blood followed the knife. The patient died next day, sinking gradually without suffering. An autopsy was refused, but the femoral artery from the groin to its extremities in the wound were allowed to be examined. The artery was pervious and empty, except some soft clots, adhering slightly to its inner wall, which, when scraped off, showed the inner coat of a bright roseate colour, gradually fading in its descent. The veins were not obstructed.

Case XXIV.—This patient had previously borne a large family. Her last labour was easy, for it came on prematurely, and the child was dead born. On the third or fourth day subsequent to delivery fever supervened, followed by swelling of the left leg and thigh, which was attended with great pain and suffering. In the course of two or three days gangrene showed itself, and when Dr. Reid was called in, the whole extremity was already dark coloured, and the mortification extensive. She died ten days after delivery. There was no dissection.

After gangrene in an extremity occurs in a puerperal mother, death has almost always followed, whether the disease was left to the effects of nature, or amputation had recourse to as in Case XXIII. An instance of puerperal gangrene in one of the legs was published in the *Lancet* for 1845, by Mr. Bottomley of Croydon, and is interesting from the circumstance that the patient recovered after amputation of the mortified parts. Mr. Bottomley writes me, that he has no doubt that the gangrene originated in arteritis, or arterial obstruction. The history of the case is as follows :—

Case XXV.—The patient, æt. 39, was confined on the 8th of February 1845. Her pregnancy was favourable until within a month of delivery, when she suffered from cough and great debility. The labour, however, was expeditious ; the lochia were small in quantity ; and the after-pains slight. The woman continued doing well for ten days, when symptoms of pleuritis, with considerable constitutional disturbance, presented themselves. These symptoms disappeared under the treatment employed. Two or three days after her recovery from the pleuritic attack, she complained of pain in the heel, passing from thence to the great toe and ankle-joint. No abnormal appearance, however, could be found when these parts were examined. The pain was treated by Mr. Bottomley as neuralgic, by veratrian ointment, morphia, etc., but with no good result. At length a livid spot appeared on one of the toes, the temperature of the foot and leg became gradually diminished, and there was impaired sensibility. This diminished temperature and sensibility continued to increase. The toes severally became black, and this appearance extended so as to involve the foot and ankle. At length a line of demarcation was formed about two inches above the ankle-joint, and amputation was thought of, but deferred until the patient's health should be somewhat improved. On the 3d of May the leg was amputated above the knee. It was deemed advisable to operate as high up as this ; for although the line of demarcation was just above the ankle-joint, and the skin had its normal colour higher than this, still there was much swelling, some hardness and pain in the calf, and the cause of the gangrene was believed to be a constitutional one.

When the tourniquet was applied, it was noticed that the pulsation in the femoral artery was hardly perceptible. After the removal of the limb, both the femoral artery and vein were found plugged with a transparent semicartilaginous substance.

The recovery of this patient was complete, and, as I am lately informed by Mr. Bottomley, she has borne two children since the occurrence of this attack of puerperal gangrene.

The preceding contribution gives a view of puerperal arterial obstruction and inflammation, that is in many respects altogether unfinished and imperfect. Of its many defects no one can be more deeply and sincerely aware than I myself am. But imperfect and defective as the sketch is, it will answer the principal purpose for

which it is intended, provided only it be fortunate enough to direct the attention of my obstetrical brethren to the subject, and thus initiates a full investigation into this new form of puerperal disease.

RECOVERY FROM PUERPERAL CEREBRAL EMBOLISM, AND SUDDEN DEATH IN A SUBSEQUENT PREGNANCY.

Professor Simpson said: On the same day on which we examined the body of the patient whose history I have brought under your notice, I had occasion to assist at the autopsy of another patient, whom I had seen several times during life, and whose case was of a very different, and, to me, still more interesting nature. About five years ago, immediately after the publication of an essay on puerperal embolism, I was asked by Dr. Alexander to see a patient who had arrived at the eighth month of her fourth pregnancy, and who, after walking up a stair, had been found by her servant lying in a stupid and almost senseless state. When Dr. Alexander saw her she was suffering from hemiplegia of the whole of the right side of the body, and he requested me to visit her along with him, with the view of consulting as to whether anything should be done towards anticipating the occurrence of parturition. Among other cases that I had published was one of the wife of a distinguished obstetrician, himself but recently dead. That lady, the nature of whose disease had been skilfully diagnosed by Dr. Burrows during life, was found to have died in consequence of softening of the corpus striatum, produced by the impaction in one of the branches of the middle cerebral artery of a small embolus which had become detached from some of the cardiac valves. In Dr. Alexander's patient I suspected that the same kind of accident might have happened, for the carotid artery was pulsating more powerfully on the left side than on the right; and there was no evidence of any congestive or inflammatory action having taken place within the cranium. Moreover, after a careful examination of the heart, Dr. Halliday Douglas discovered that the mitral orifice was to some extent contracted; and it seemed in every degree probable that some vegetation might have been produced on the contracted valves during the period of pregnancy, when the blood is

[1] See Proceedings of Edinburgh Obstetrical Society, May 8, 1861, in *Edinburgh Medical Journal*, May 1862, p. 1085.

in a hyperinotic condition, and that as a result of the increased action of the heart, brought on by the effort of ascending the stair, some portion of these vegetations might have got loosened, and been carried into the cerebral vessels. Up to that time, so far as I am aware, no case of cerebral puerperal embolism of this kind had occurred in which the patient had made a recovery; and in this case I formed a very gloomy prognosis. She carried her child, however, to the full time, and was easily delivered; recovered subsequently so far as to be able to move about, although she walked lamely; had her power of speech impaired, and had only very imperfect use of the right hand. She has since borne one or two children without any untoward circumstances.

I had heard of her progress from time to time from Dr. Alexander, but did not again see her professionally till Friday last, when I was summoned about mid-day, as she seemed to be dying. On my arrival at the house, I learned from Dr. Alexander that she was in the seventh month of pregnancy: he had seen her the night before, and thought her not quite so well as usual, having remarked, in particular, that the left hand, which was the one she now always used in shaking hands, was unnaturally cold, although she herself declared there was nothing amiss with her general health. Her husband had left her at ten A.M., apparently well, but soon afterwards she became suddenly ill, and the servant, who was alone in the house with her, was afraid to leave her; so that the doctor was not sent for until after the return of her husband between twelve and one o'clock. Dr. A. found her in bed, breathing very laboriously, cold and collapsed, but quite sensible and capable of answering his questions in her ordinary broken and inarticulate manner. He succeeded in making her swallow a little brandy; so that, when I saw her shortly afterwards, she was not altogether so sunken as when he first saw her. But still she was evidently in a moribund condition. The countenance had an anxious, alarmed expression; the skin was cold and clammy, and strangely discoloured, being partly livid from the stasis of blood in the superficial vessels, and partly yellow, perhaps from the decomposition and diffusion of some of the colouring matters of the blood (one small vein in the columnæ nasi was especially remarkable from the excessive degree of turgidity and the darkness of the contained blood); the pulse was small and fluttering, hardly at times to be felt at all; the action of the heart was tumultuous and irregular, but the loud respiratory sounds in the patient's throat rendered it impossible to distinguish any cardiac

murmur or any distinct pulmonic sound. The fœtal movements had ceased, and no cardiac or placental sounds were audible. Two hours afterwards the patient died.

On making a post-mortem examination, we found the cerebral lesion to be seated at the base of the brain on the left side, below and to the external side of the left ventricle, where a cavity of considerable size existed, which involved the lower and anterior portion of the corpus striatum, and was lined by a very vascular serous-looking membrane. This cavity was elongated, but contained almost no fluid; its lateral surfaces being in mutual contact. The branches of the middle cerebral artery running towards it from the fissure of Sylvius were all carefully examined, but no obstruction could in any of them be discovered. But if we reflect on the length of time that had elapsed since the occurrence of the hemiplegic attack, we can easily understand how all trace of the original cause of the cerebral lesion may have become obliterated. For we know that a pretty extensive destruction of cerebral substance may result from the impaction of an embolus in even a small artery; and in the lapse of years such an artery may have degenerated into a small undistinguishable fibre running in the pia mater; or the small plug may itself have become disintegrated and dissolved, and the lumen of the artery may subsequently have become restored. In either case the portion of brain, temporarily deprived of its vascular supply, and perhaps otherwise damaged from the disturbance of the circulation in the surrounding vessels, had become destroyed, and its place only indicated by the kind of cystic cavity of which I have spoken. The source of the embolus was easily discernible in the condition of the mitral valves. The left auriculo-ventricular orifice was so contracted as barely to admit the point of the forefinger; the valves, as well as the tendinous cords attached to them, were shortened and thickened, and on the free surfaces of each, towards the margins, there were one or two warty-looking projections which were overlaid by fresh coagula. There were firm recent clots lying behind the valves, which had probably begun to form during life, and impeded the heart's action. Similar coagula stretched along the pulmonary veins. I had imagined, from the suddenness of the attack, that an embolism might have taken place in some of the branches of one or other pulmonary artery; but these were found, on careful examination, to be all quite free, and the pelvic veins contained only fluid or loosely coagulated blood. The lungs presented no trace of any recent morbid affection, only they were slightly œdematous, and

both, but more particularly the left, had undergone to a slight degree that kind of change which Virchow has described as brown induration of the lungs.

TETANUS FOLLOWING LESIONS OF THE UTERUS, ABORTION, AND PARTURITION.[1]

Dr. Robert Reid, in his work *On the Nature and Treatment of Tetanus*, etc., states that "injuries or derangements of *internal organs* do not appear to have much tendency to produce this affection. Indeed," he adds, "I have not been able as yet to find any case recorded of true tetanus which arose from *internal injury*, whether in the alimentary canal or elsewhere."[2]

The uterus is certainly an "internal organ," in the sense in which that expression is used by Dr. Reid; and internal injuries or lesions of it, both in the unimpregnated and puerperal states, are, without doubt, sometimes followed by tetanus in an acute and fatal form. This fearful complication is fortunately a rare occurrence in midwifery practice. But the following series of cases is calculated to show that traumatic tetanus does supervene occasionally as a secondary obstetrical disease, in the same way as all medical authorities acknowledge it to supervene occasionally—and still more frequently—as a secondary surgical disease.

Before, however, detailing the proofs which I wish to adduce of this last remark, let me premise that in ancient times tetanus was usually considered and described, for example by Aretæus, as a disease more common among females than males. Modern statistics, however, have amply shown the reverse to be true.

Out of 128 cases of traumatic tetanus collected by Mr. Curling, 112 were males, and 16 only were females.[3] Out of 221 cases collected in an excellent paper by Professor Lawrie of Glasgow, 185 of the patients belonged to the male sex, and 36 to the female sex.[4]

The Registrar-General's Official Reports afford a still greater amount of evidence on the relative liability of the two sexes to tetanus. The number of fatal cases of tetanus which have occurred annually in England and Wales during the last fifteen or sixteen

[1] See *Edinburgh Monthly Journal of Medical Science*, February 1854, p. 97.

[2] *Nature and Treatment of Tetanus*, p. 52.

[3] *Treatise on Tetanus*, Table in Appendix.

[4] *Glasgow Medical Journal* for October 1853, p. 352.

years has varied from about 120 to 150; in 1847 as many as 165 died of this disease. The number of deaths from tetanus, etc., has, unfortunately, not been published for every year of the reports; in some of the years, those occurring in the metropolis are not given; and occasionally the data as to the sexes of the patients cannot be discovered in the official returns. But from 1837 to 1842, I find 629 deaths from tetanus entered in the reports, with the numbers of each sex stated; and from 1847 to 1849, there are 430 deaths from tetanus similarly specified. Out of these 1069 fatal cases of tetanus, 829 belonged to the male sex, and 240 to the female sex. In other words, out of every 100 of these cases, 77 per cent were males, and 23 per cent females. Or the males attacked with fatal tetanus were to the females in the proportion of nearly 4 to 1.

In how many of the above 240 instances of fatal tetanus in the female sex the uterus was the seat of traumatic irritation or injury we have no means of judging. Doubtless, the proportion was but small. The following cases, however, will tend to prove that this dreadful malady may follow—(1) lesions of the unimpregnated uterus; as well as the lesions left in the uterus and maternal canals, (2) by abortion; and (3) by parturition at the full time:—

I. Tetanus after Lesion of the Unimpregnated Uterus.

Lesions and injuries of the unimpregnated uterus seem to have little tendency to produce traumatic tetanus. But the following instance affords a remarkable example of this formidable complication:—

Case I.—A widow, æt. 35, who had been suffering for many months under severe menorrhagia, came from a considerable distance for advice. The uterus was large and heavy, and evidently contained some roundish morbid mass either in its cavity or in its walls. The use, for a few hours, of a single sponge-tent opened up the os uteri, and allowed a polypus to be felt in the interior of the uterus. Menstruation supervened in a profuse degree; and any further local treatment was in the meantime suspended. In a few days uterine contractions came on. They were severe in character, and gradually pushed down a large cellular polypus from the uterus into the vagina. No special operation was required to detach it, as the expulsive efforts of the uterus had, in a great measure, spontaneously broken up the adhesions of the tumour with the interior of the uterine cavity; and at last the polypous mass was found so loose as to be easily removed from the vagina by slight traction with the fingers. It proved to be a cellular or loose fibrous polypus, of the size of the closed fist. After the separation of this mass the patient felt comparatively well. She was free from fever and local pain, and appeared for a time quite convalescent. On the ninth evening, however,

after the polypus was detached, she sent for me, to complain of some stiff and strange feelings about her face. At the time of my visit she was sitting up, drinking tea. She herself remarked that she was almost unable to swallow it, from pain and difficulty in opening her mouth, which she had first noticed a few hours previously. My suspicions of tetanus were not at the time excited. I believed, with the patient herself, that she was threatened with an attack of cynanche. But early next morning, all the symptoms of the disease were becoming far too marked to leave any doubts of its nature. The muscles of the neck were affected with tetanic spasms, and the jaws fixed. Deglutition was impossible. During the day, Professor Syme saw the patient with me. In spite of all the usual remedies, the tetanic paroxysms increased in extent, in frequency, and in severity. She bore the terrible spasms with wonderful equanimity, and her mind seemed to remain entire up to the very last. She died, exhausted by the disease, about fifty-five hours after the first symptoms of tetanus were observed.

On making a post-mortem examination, no special lesions were found in any organ examined, with the exception of the uterus; and there the principal, or, indeed, only morbid appearance, consisted of the shaggy and projecting attachment of the uterine extremity of the ruptured pedicle of the polypus, marking the spot where it had adhered to the interior of the body of the uterus.

I do not remember of having heard or read of any analogous case in which a lesion of the unimpregnated uterus was followed by traumatic tetanus. Mr. Curling refers to an American case, recorded by Dr. Smart, in which the disease was supposed to have been produced by an injury of the neighbouring mucous canals—viz. "by the passage of large, rough, angular pieces of clay from the intestinal canal into the vagina."[1] The case, however, is not an example exactly in point. A French author of the sixteenth century, Martinus Akakia,[2] states—apparently in the way of a general observation, from one or two individual cases—the occurrence of trismus, general tetanus, and opisthotonos, running on to a fatal termination by the fourth day, as an occasional sequence of menorrhagia, whether that menorrhagia, or hemorrhage, had been the result of diseased states of the unimpregnated uterus, or of abortion, and delivery.

II. Tetanus after Abortion.

Several of our oldest medical authorities describe abortion as one of the occasional causes of tetanus. "Individuals," observes Archigenes, "are attacked with this disease in consequence of various causes, as from wounds, and in women from abortion (*in fœminis ex*

[1] *Treatise on Tetanus*, footnote, p. 197.

[2] *De Morbis Mulicbribus*, lib. i. cap. 6, "De fluxu rubro." See Spachius' *Gynæciorum Libri*, p. 759.

abortu)."[1] When speaking of the causes of tetanus, Aretæus specially enumerates wounds of all kinds, with exposure to cold, and he adds that "women are sometimes, though rarely, attacked with the disease as a result of abortion."[2]

In none of our modern obstetric books, nor in any of the various essays or works devoted to the consideration of abortion or puerperal diseases, is any illusion made, so far as I know, to the possible supervention of tetanus after miscarriage. It is a complication, however, which does occasionally take place; and it is always one very formidable in its character, and generally very fatal in its issue. Two deaths from tetanus after abortion occurred some years ago, almost simultaneously, in Edinburgh. I have the kind permission of Dr. Alexander Wood and Dr. Malcolm, in whose practice these cases occurred, to state the following particulars regarding them :—[3]

Case II.—A lady, aged about 36, and the mother of six children, after having had the catamenia obstructed for three months, was attacked on 16th November 1845, with symptoms of abortion. On the 17th, the os uteri was open, and large coagula were expelled. In three or four days she was so far recovered as to require no more medical care. On November 23d, the patient suffered under some degree of sore throat and stiffness of the jaws. Early next morning, when Dr. Wood visited her, he found the rigidity of the jaws so considerable, and the difficulty of opening the mouth so great, that it was impossible to get an inspection of the throat. The pulse was 80, soft and compressible. During the day the stiffness of the jaws increased, acute pain of the spine was complained of; the abdominal muscles were rigid; and swallowing became difficult. General tetanic spasms supervened in the evening, and notwithstanding the employment of turpentine, tobacco, Indian hemp, etc., the disease contined to increase, and she died on the evening of the 26th.

Case III.—In this case the tetanic attack was still longer in supervening after the abortion. Nearly a fortnight after an early miscarriage, and when the patient was considered well, she was suddenly attacked with symptoms apparently of cynanche parotidea. On the second day, Dr. Malcolm found his patient unable to open the jaws. On the third day, the symptoms were all much aggravated; and on the fourth day, she was seized with general tetanic spasms, which recurred again in two hours with increased violence, and then proved fatal in the course of a few minutes. Dr. J. Duncan, and one or two other medical gentlemen, saw this lady in the first of these general tetanic paroxysms, during Dr. Malcolm's unavoidable absence at an obstetric case.

In the following instance the ovum was at least partially separated, as shown by the attendant hemorrhage and by a segment of

[1] See Aetius' *Tetrabibl.* ii. sec. ii. cap. 39.

[2] *De Causis Acutorum Morborum*, lib. i. cap. 6; vol. i. p. 2, of the Latin edition in the *Medicæ Artis Principes.*

[3] Notes of these two cases have already appeared in the published Proceedings of the Obstetrical Society. *Edinburgh Monthly Journal*, April 1850, p. 387.

it being felt protruding through the os uteri. In all probability it passed—as ova in early abortions sometimes do—when the bowels or bladder were evacuated, and unobserved by the patient's immediate attendants. If not, the case must be reckoned one of fatal tetanus, with the ovum partially separated, but not expelled. I have been favoured with the notes of it by my friend, Dr. Hislop of East Linton, in whose practice the case occurred.

Case IV.—The mother of a family, who had never aborted previously, had not menstruated for nine weeks, when she was seized with a considerable loss of blood from the vagina, which left the pulse quick and feeble. The bleeding soon ceased, but next morning Dr. Hislop found the pulse at 120, the os uteri relaxed and open, and a soft mass protruding through it. He introduced a sponge into the vagina to restrain the hemorrhage, which had recurred to a slight extent, and gave the patient some small doses of ergot of rye, to expel the ovum. The membranes were not observed in the vaginal discharge, but the convalescence of the patient went on satisfactorily, till six days subsequently, when she first complained of "weakness of the lower jaw." Next morning the jaw felt stiff, and could not be opened more than half. The patient herself became anxious and alarmed. In the evening any attempt at swallowing produced a sensation of choking; and there was a copious secretion of viscid saliva. On the following day the jaw was still more fixed, swallowing became impossible, tetanic spasms began to affect the back of the neck, and subsequently they stretched to the chest, back, and extremities. By night the opisthotonos was complete, the spasms increased in severity, the pulse rose to 160, her mind, however, remaining quite clear; and she expired next morning, or on the third day after the tetanic symptoms began. The treatment principally consisted of large opiates, interrupted during the second day of the attack, till the bowels were acted on by a dose of croton oil, and by turpentine enemata.

Tetanus, when it has taken place in obstetrical practice, has apparently been repeatedly mistaken, in its earliest stages, for an attack of cynanche (as in the first case I have detailed); or even oftener, perhaps, for some irregular form of hysteria. It is only after the tonic spasms have passed to other muscles than those of the jaw and neck, that the actual presence of such a fearful and fatal malady has in general been fully realised by the mind of the medical practitioner. The notes of the following case, obtained for me by Dr. Symonds, and drawn up by a medical gentleman, a near relative of the patient, afford an instance in point. The case also offers another example of the fact, that amid the mortal and agonising struggles of the patient, the reason and intellect often remain clear and unclouded up to the last fatal spasm—the disease being originally and truly an affection of the reflex spinal system and not of the brain.

Case V.—A lady, aged 41, of a delicate and nervous temperament, and the mother of six children, miscarried at an early period of pregnancy (17th Nov.

1849). So much hemorrhage occurred that it was necessary to use the tampon. During the following week she suffered severely from the effects of loss of blood, and was especially troubled with palpitation, headache, and a sensation in the throat resembling the hysterical globus. On the morning of November 25th, or seven days subsequent to abortion, she experienced a difficulty in deglutition and a stiffness in the jaws and neck, which gradually increased and became paroxysmal in their character, leaving eventually no doubt of the existence of true tetanus, though it had been hoped previously, that hysteria, with the addition of "a stiff neck" from catching cold, would explain all. The existence of complete trismus subsequently formed a leading feature throughout. Deglutition, too, was much impeded at an early period, and soon became almost impracticable. The muscles of the neck, chest, and abdomen, were fully affected with the tetanic spasms; but not those of the back or extremities. Towards the termination of the case the larynx became involved, and the paroxysms of strangulation, several of which occurred before death, were agonising in the extreme. The spasmodic exacerbations, irrespective of these laryngeal paroxysms, were very severe. About sixty hours from the commencement of the tetanic symptoms, death relieved the poor patient from her sufferings, in a paroxysm of strangulation. The mind and reason were unaffected to the very last.

There is a case of fatal tetanus after abortion mentioned by Velpeau in his Essay on Puerperal Convulsions,[1] where the first symptoms of the disease were overlooked as unimportant. The details given by Velpeau are as follow :—

Case VI.—At the commencement of the year 1834, a young woman entered as a patient at the Hôpital Cochin, in consequence of a miscarriage. After some little time she was seized with trismus, to which little attention was paid. It was thought even that she complained without reason, and that she suffered less than she professed. A change in the service about this time occurring, she was in some sort forgotten. Nevertheless, these convulsive movements spread little by little, although slowly, to all the other parts of the body. Several bleedings were employed, but nothing was able to arrest the progress of these symptoms, and the unhappy woman died in a complete state of opisthotonos. No manifest lesion was found upon the dead body. The uterus, the brain, the spinal cord, and the viscera, appeared in a normal condition.

The symptoms of tetanus are liable to considerable variations in different cases. The following case of fatal tetanus connected with abortion, for the notes of which I am indebted to a very accurate observer, Dr. Ritchie of Glasgow, is remarkable as one of the rare instances in which the spasmodic paroxysms affected, during one period of the disease, the muscles that open the lower jaw, instead of, as usual, the muscles that close it :—

Case VII. — Mrs. ——, aged 40 ; the mother of seven children ; eccentric and nervous ; when in the third month of pregnancy was exposed to sudden mental agitation. On the instant she had a flow of blood from the vagina. This

[1] Observation 21, p. 232.

ceased on lying down, when the os uteri was found shut, but the cervix bulky. Next day, on removing a tampon which had been left at the previous visit in the vagina, it was found that the os uteri could easily admit the finger, that the membranes were tense, and that there was no bleeding. The plug was re-introduced, and, soon afterwards, the membranes gave way, the rupture being accompanied by a loud noise and a discharge of watery blood and some clots. The tampon was again had recourse to, but about ten in the evening, much suffering being caused by it, the patient withdrew it. This was succeeded by profuse hemorrhage and alarming faintings till two A.M. There was no evidence of the expulsion of the ovum excepting the appearance of some shreds of decidual membrane, although it was possible that such might have been passed unseen in the clots.

From this day, the discharge ceased, the os uteri closed, and there was every symptom of convalescence, except that the neck of the womb continued to be bulky. Some clots passed from the vagina on the 11th day; and next day, while about to chastise a child, she was seized with locked jaw, succeeded by a sense of suffocation in the throat, and, two days after, by tetanic spasms or cramps in the muscles of the neck and back, and by acute shooting pains in the articulations of the lower jaw.

She was put on a course of calomel and opium with croton oil. The mouth became sore on the 3d day of the tetanic attack, and dysentery also set in, apparently from the oil. The spasms of the neck and face continued, although rather less intensely. Some fetid clots escaped from the uterus. She was now put on 25 drops of laudanum every three hours, the former medicine being omitted. On the 4th and 5th day of the disease the tetanic spasms ceased, and the dysentery also had disappeared. The opium was discontinued.

But during the course of the 6th day after the commencement of the tetanus, she was again accidentally excited, and in consequence seized with general rigidity of the muscles of the body. The mouth was thrown violently and widely open, the face became livid, spasmodic movements of the limbs succeeded, with complete insensibility, lasting for about half-an-hour. These paroxysms were succeeded by intervals in which the jaw became firmly closed, and she was affected with convulsive jerking movements, occasioned apparently by contraction of the extensor muscles of the back.

During the ensuing twenty-four hours she suffered from about four or five of the first-mentioned seizures; and in the intervals her head was violently drawn backwards every few minutes, occasioning a sensation at the throat as if she were about to be strangulated. The severe fits usually began with a sense of constriction at the chest and of a want of air. She died at last in one of these fits, on the evening of the 7th day from the first commencement of the tetanic symptoms.

In some of the preceding instances of tetanus following early miscarriage, there was nothing particular in the phenomena of the abortion, and nothing special in the treatment which the cases required. In fact, in several of the examples adduced (as in Nos. II. III. and VI.), no medical or obstetric treatment seems to have been called for during or after the miscarriages—the cases being in all respects simple and uncomplicated. But in others (as in Nos. IV. V. and VII.), there was one special complication present—viz. hemorrhage, and one special and effective mode of arresting it adopted—viz. plugging the vagina. I do not allude to these

instances as any certain evidence that either this special symptom or special treatment were connected, in the way of causation, with the subsequent occurrence of the tetanus. The vagina is daily plugged by obstetric practitioners, to restrain hemorrhage both from the unimpregnated and pregnant uterus, without any such evil consequences following; but we have so far a certain amount of proof, in these instances, that tetanus, after abortion, is more particularly liable to supervene, either where the uterine surface is in such a state of injury and lesion as to lead to the protracted continuance of hemorrhage, or where the maternal canals have been irritated by the tampon, when used as a mechanical means to diminish and arrest that hemorrhage. Dr. Adams of Lanark has furnished me with notes of a case of fatal tetanus after abortion that occurred in his practice when he was settled in Glasgow, which affords an illustration of the disease supervening upon the arrestment of the attendant degree of puerperal flooding. The patient was, in Dr. Adams' absence, attended by Mr. Crossken, who has drawn up notes of the symptoms and post-mortem examination.

Case VIII.—Mrs. ——, the mother of several children, had a miscarriage at the third month. A slight degree of hemorrhage followed. On the eighth day after the abortion this discharge suddenly ceased, and a feeling of stiffness soon after supervened in the masseter muscles. Next day the jaws were quite locked, and the head was bent backwards with tetanic spasms, the muscles of the jaw and neck being fixed and rigid. The eyeballs were also sunk, and the eyelids partially closed. The patient, however, was able to speak; but the deglutition of fluids was impossible. The pulse was 72; the bowels constipated and flatulent; and the urinary secretion natural. There was no discharge from the uterus, and no uneasiness or pain in that region. The pulse betimes became weaker, and the tetanic paroxysms more and more severe and frequent; and she sank and died in about seventy hours after the appearance of the first symptoms of tetanus.

The body was examined by Mr. Crossken and Dr. Fleming about thirty-six hours after death, and as the morbid appearances were in some respects peculiar, I will state them in Mr. Crossken's own words. "The uterus," he reports, "was about the ordinary size. Its substance and internal lining membrane were emphysematous throughout, full of air-vesicles, and crepitating under the fingers. In fact it was like a piece of lung, and resembled it also by floating in water. There was, however," he adds, "no appearance whatever of decomposition."

In surgical pathology, inquiries have been repeatedly instituted, with the view of ascertaining if there was any kind of settled con-

nection between the existing state of the wound and the occurrence of tetanus, but without much success. For surgeons seem generally agreed upon the fact, that while the tetanic disease very frequently supervenes when the external wound appears in all respects perfectly healthy, in about an equal proportion of other instances it comes on when the wound is unhealthy, or inflamed, or sloughing. In some of the preceding examples of obstetrical tetanus supervening after miscarriage, the lesion or wound, left on the interior of the uterus by the abortion, seems to have been in a "healthy state," as far as could be ascertained; in others it was so far unhealthy, as to have been a source of morbid sanguineous oozing and hemorrhage. In none of the examples of obstetrical tetanus, included in this or in the next division, does there appear to have been any tendency to inflammation of the uterus as an antecedent to the occurrence of tetanus.

III. Tetanus after Parturition.

Puerperal tetanus, when following parturition at or near the full time of pregnancy, seems to be guided, in regard to the period of its supervention, by the same laws as regulate the occurrence of the disease after abortion, or after surgical operations and injuries. Under all of these conditions the tetanic attack usually does not commence till about a week after the occurrence of the exciting obstetrical or surgical lesion. According to some statistics published by Romberg,[1] in more than half of all instances of surgical tetanus—or in 112 out of 208 cases collected by him—the attacks set in between the 3d and 10th days after the receipt of the injury, or the occurrence of the operation. The same period includes the dates at which the tetanic seizure usually took place in the examples of obstetrical tetanus which I have already detailed, as well as in those which I have collected under the present head. In the following instance, which occurred in the practice of my friend, Dr. Lyell of Dundee, the tetanic symptoms began on the sixth day after delivery at the full time, and when there was apparently nothing unusual in the labour itself, or in the puerperal state of the patient, to excite the disease.

Case IX.—A patient, aged 25, was delivered of her first child at the full term of utero-gestation, without any unusual complication, the labour being easy, and only of seven hours' duration. On the sixth day after her accouche-

[1] *Manual of Nervous Diseases*, vol. ii. p. 105.

ment, stiffness of the muscles of the back came on, followed by symptoms of trismus, which daily increased. On the third day of the attack, on attempting to swallow, strong opisthotonos at length supervened, the head being drawn back between the shoulders. The tetanic symptoms went on increasing, till the patient sank on the sixth day of the disease (the twelfth from delivery). The treatment consisted principally of large opiates; but they failed either in procuring sleep or in relieving the tetanic spasms. Venesection also, and turpentine in the form of enema, were tried. The child (a female) was living, and afterwards throve well. "There was," adds Dr. Lyell, "no perineal laceration or other injury to be ascertained."

In the following case of puerperal tetanus, reported to me by Dr. Lever of Guy's Hospital, in addition to the usual lesions left by delivery in the interior of the uterus, there existed also, as possible traumatic causes of the disease, lesions or injuries of the maternal passages and perineum:—

Case X.—A mother, about seventy-two hours after delivery, was attacked with tetanus. The disease presented all its most characteristic symptoms. In this patient, laceration of the vagina and perineum had occurred during the process of labour. Opium was given in large quantities; but the disease proved fatal in three days. The child also died, affected with trismus and jaundice.

I have already alluded to the circumstance that an unusual degree of hemorrhage, and the use (sometimes prolonged) of the vaginal plug, seem to have been precedents to a considerable number of the instances in which tetanus appeared in connection with early abortion. In the two following cases of tetanus after parturition at the full time, the same or similar causes were also antecedent to the occurrence of the fatal attacks of this disease. For the notes of the first example I am indebted to Dr. Mackinlay of Barrhead; the second has already been placed on record by Dr. Storer of Boston.

Case XI.—A mother, aged 27, was delivered, at the full time of pregnancy, of her second child, on the 2d February 1852. She made for three or four weeks a fair recovery; but suddenly, after some physical over-exertion and much mental disquietude, she was attacked with secondary uterine hemorrhage on the 27th February. The flooding was so great as to require the vagina to be plugged by a surgeon, who was called in. He left the plug in the vagina for two or three days. On the 5th March, stiffness about the face and neck came on. Early next morning the trismus was very marked; and she continued to show, in an increasing degree, all the characteristic symptoms of tetanus, up to the 8th March, when death put an end to her sufferings. The tetanic spasms principally showed the opisthotonic form.

Case XII.—Mrs. C——, aged 28, and the mother of two children, was delivered at the full time of an infant that weighed eight pounds. The umbilical cord broke off near its origin in endeavouring to extract the placenta. After some unsuccessful attempts to detach the afterbirth, it was considered proper to

desist from further efforts. The attendant hemorrhage was slight. During the five following days the pulse remained good, and the patient free from fever or uterine pain. Towards the commencement of the sixth, a fragment of placenta was removed from the vagina, and after the use of ergot two other placental masses were expelled—decomposing, and offensive in smell. On the seventh day the pulse was, for the first time, above 100, small and wiry ; and the patient complained of pain in the head, considerable stiffness of the jaws, and a difficulty of swallowing. These symptoms rapidly increased during the day, and at night the tip of the tongue could scarcely be protruded between the teeth. The muscles of the neck and jaws had also become much more painful ; the respiration was laborious ; and, at irregular intervals, tetanic spasms were present. Next day, the eighth after the birth of the child, the muscles of the face were so rigid that the jaws could not be separated in the slightest degree. The merest touch seemed to distress the patient, and to hasten on the spasmodic attacks, which recurred every few minutes. The head was retroverted upon the pillow ; and so firmly contracted were the muscles of the neck, that when the hand was placed behind her occiput, the whole body was brought forward, the neck not being flexed in the slightest degree. When the spasms were present, the patient's sufferings appeared to be extreme. The paroxysms increased in frequency until about midnight of this, the eighth day after parturition—when she sunk, exhausted by opisthotonos. Throughout, there were not any symptoms of uterine or peritoneal inflammation.[1]

External injuries and lesions form certainly the most common sources of tetanus. And next in frequency as an exciting cause of the disease, authors usually reckon exposure to cold, or rather to currents of cold and damp air—especially if the person has, immediately before this exposure, been overheated or perspiring. Wounds may lead to tetanus without any exposure to cold ; and exposure to cold sometimes leads to tetanus, without the presence in the body of any appreciable lesion. But though these two sources of tetanus may each confessedly lead to the production of the disease quite independently of the other, their *combined* action far more frequently leads to this result. Most of our surgical authorities, who have seen much of tetanus in practice, agree in stating that in surgical subjects the disease has very often been observed to occur immediately after those bearing surgical lesions upon their body have been accidentally exposed to cold currents, or to sudden changes of temperature. The same fact seems also to hold good with regard to puerperal tetanus. In one of the cases already detailed (Case II.), Dr. Wood found that, a few hours before the patient was attacked with tetanus, she had thrown her window open, and dressed her hair, exposed to the draught of cold air from without. In the three following cases of puerperal tetanus, all of which occurred in the practice of one physician, Dr. Aubinais of

[1] *American Journal of Medical Science* for January 1842, p. 97.

Nantes,[1] sudden exposure to cold seems to have been instrumental in lighting up the tetanic attack.

Case XIII.—In a primiparous patient, the milk-fever was high on the fourth day, when the woman, æt. 30, crossed a wet floor, with her feet naked, and while her skin was covered with perspiration. She was speedily seized with prolonged shivering, abdominal pain, and suppression of the lochia; and gradually the tetanic condition, commencing with difficult deglutition, markedly prevailed, inducing a slight degree of emprosthotonos. She died seven days after tetanic symptoms began.

Case XIV.—A woman, æt. 34, while in a state of perspiration, exposed herself to wet and cold four days after her confinement, with the effect of suppressing the lochia. Tetanic symptoms appeared twenty-four hours subsequently, and soon became strongly developed. The disease obstinately resisted the most active treatment until the tenth day, when it began to yield, and the patient ultimately recovered. She was bled six times, 100 leeches were applied, and musk and valerian were afterwards given.

Case XV.—A poor woman, æt. 28, having suffered from an attack of eclampsia, for which she was bled, was delivered a few days afterwards of a seven months' child. She went on very well until the fifth day, when, having drunk a large quantity of cold water, she was seized with shivering, followed by trismus and difficult deglutition. These symptoms went on to complete tetanus. On account of her enfeebled state, blisters were alone resorted to, and the lochia were restored by warm baths. The spasmodic symptoms did not abate for twenty days; and forty elapsed before she was quite restored.

The author of the article on Tetanus in the *Dictionnaire des Sciences Médicales*, M. Fournier-Pescay, mentions an instance, similar to the above, in which exposure to cold acted apparently as the more immediate excitant of an attack of this disease in a puerperal patient.

Case XVI.—A woman, sixteen days after her confinement, was for a short time exposed to cold and cold draughts. She experienced at the time a sensation of great chilliness; and suppression of the lochia suddenly followed. Ten or twelve hours subsequent to this exposure all the muscles of her body were powerfully contracted (*fortement contractés*). She was bled with the lancet, leeches were applied to the vulva and epigastrium, and emollient tepid drinks and baths were employed. Under their use the patient's symptoms disappeared, while the lochial discharge became re-established.[2]

In a case of puerperal tetanus, published from the notes of the late Mr. Colles of Dublin, exposure to cold seems also to have been considered as an important link in the excitement of the attack.

Case XVII.—A woman who had been delivered a fortnight before of her sixth child, was exposed to cold. That same evening she felt tightness of her

[1] *Revue Médico-Chirurgicale*, tom. v. p. 149. *British and Foreign Medical Review* for July 1869, p. 146.

[2] *Dictionnaire des Sciences Médicales*, vol. lv. p. 15.

jaws, and was ordered opium, and mercurial ointment. Next day she could open her mouth better, but during it had two or three tetanic paroxysms, and died.[1]

In the case which I have just cited from Mr. Colles, the disease occurred in June; and there seems to be a prevalent idea in the profession that tetanus is more common in our own climate in the warm than in the cold months of the year; in summer more than in winter. But the idea is of very doubtful accuracy. In one of the Registrar-General's Official Reports[2] there has been published a table showing the relative number of deaths produced by different special diseases in London during the four different quarters of the year, and from 1840 to 1847 inclusive. During these seven years 179 individuals died in the English metropolis of tetanus. Of these 179 cases, 49 occurred during the spring quarter of the year ending with March; 37 during the summer quarter ending with June; 34 during the autumn quarter ending with September; and 39 during the winter quarter ending with December. Such facts show, beyond cavil, how very little influence, if any, season has upon the frequency of tetanus in our own climate.

Traumatic tetanus is a disease which is generally alleged by pathologists to be more common in warm than in temperate climates, a result to which various causes may contribute, besides the mere amount of heat. And puerperal, like surgical tetanus, would appear to occur more frequently under the tropics than with us. Thus, in some remarks which Dr. Christie has published on tetanus in Ceylon, he casually observes, that he had occasion to treat a case of tetanus consequent on parturition, "which," he adds, "the native practitioners of Ceylon inform me is *not* an unfrequent occurrence here." Dr. Christie gives the following particulars regarding this instance of puerperal tetanus:—

Case XVIII.—"A healthy woman of the Portuguese caste was, two days after delivery of her first child, seized with rigidity of the jaw, and other symptoms of tetanus. The native doctors and midwives," continues Dr. Christie, "immediately pronounced her incurable, and their predictions were fulfilled. She was in vain treated with mercury, opium, and the warm bath."[3]

Individual examples of puerperal tetanus among the inhabitants of tropical climates are sometimes incidentally alluded to in the writings of those who have practised in these climates. Thus—

[1] *Dublin Quarterly Journal*, No. xxx. p. 288.
[2] *Ninth Annual Report*, p. 151, etc.
[3] *Edinburgh Medical and Surgical Journal*, vol. viii. p. 415.

Case XIX.—In a communication[1] upon tetanus, Mr. Dickenson, surgeon in Grenada, reports concisely the histories of thirty-three cases of the disease which he met with during the time he was in practice in the West Indies. One of these cases of tetanus occurred in a female after delivery. The patient—a black—was seized with the disease soon after parturition, and died on the fifth day from the commencement of the malady. The treatment consisted of blisters, mercurial friction, and laudanum.

Puerperal tetanus has occasionally been observed to supervene after cases of operative midwifery. An instance in which tetanus succeeded delivery by turning, in a case of placental presentation, has been recorded by Mr. Finucane of Nenagh.[2] The case is further remarkable in consequence of the extreme rapidity (if the reporter's data are given correctly), with which the tetanus ran through its brief and fatal course.

Case XX.—A patient, in her fifth confinement, was attacked during labour with much flooding. On examining, Mr. Finucane found the placenta attached to the cervix uteri, and in consequence proceeded to extract the child, which was still-born, by the operation of turning. Four days afterwards, she had a violent rigor, followed by perspiration, which returned slightly on the following day. On the evening of this (the fifth day after delivery), the patient began to complain of stiffness about the articulations of the jaw, with pain in the back part of the head and neck. Early on the following morning the lower jaw was found completely fixed, and the patient was suffering under complete opisthotonos, the body resting on the heels and occiput. Every attempt to drink excited violent spasms, and the patient died in a few hours. The tetanus ran throughout its fatal course in little more than fifteen hours.

The Cæsarean operation has, from the earliest annals of French surgery up to the present time, been performed many times in Paris. The present distinguished Professor P. Dubois has himself, I believe, operated on eight patients. But it is a remarkable fact, that not a single instance of recovery from the Cæsarean section is known to have ever occurred in the French capital. The case in which the patient survived for the longest time, at least of late years, was one operated upon in 1839, and where ultimately the woman died of tetanus, seventeen days after the performance of the Cæsarean section. The following are the principal points connected with this instance of the disease :—

Case XXI.—On the 22d January 1839, Professor Dubois extracted a living child by the Cæsarean operation from a deformed dwarf. Febrile and inflammatory symptons speedily set in ; but by the 31st, these had, in a great measure, disappeared ; the pulse was 110, and the patient's appetite had returned. The patient's state continued to improve still more up to the 5th February, or till the

[1] *London Medical Repository*, vol. i. p. 192.
[2] *Lancet* for June 2, 1838, p. 388.

fourteenth day after the operation, when general uneasiness and stiffness in the movements of the jaw came on. The masseter muscles were soon affected with violent contractions; the poor patient was unable to drink; and the symptoms of tetanus became clearly established. The disease continued up to the 9th, the tetanus affecting principally the muscles of the jaw and neck; fits of suffocation supervened, and the patient at last sunk on the seventeenth day after delivery, and the fourth after the first commencement of the tetanic symptoms.

At the time the tetanus began, the abdominal wound was already completely healed, except at its lower angle. On dissection, the original wound in the uterus was found closed, not by the union of the edges of the cut uterus, but by their close adhesion to the anterior wall of the abdomen, to the posterior wall of the bladder, and to a fold of intestine. Several small abscesses existed among the peritoneal adhesions. In the spinal marrow nothing was found except a very slight and doubtful softening at one point.[1]

In the following instance of tetanus supervening in a patient who had been previously the subject both of a surgical operation and of parturition, it is difficult to say whether the fatal attack of tetanic disease belongs to the class of surgical or of obstetric cases, or pertains to either. The disease set in at an unusual distance of time after parturition, and at a still longer date after the surgical operation.

Case XXII.—In 1809, Mülder of Gröningen excised the knee-joint of an adult female, in whom articular disease had been of long standing. Great irritative fever followed at the end of nine days; and, later, she suffered intensely from the knee, and from hectic fever. At the lapse of two months after the operation, she was delivered of twins, and ultimately she died from tetanus, seven weeks after delivery and fifteen weeks after the operation for excision.[2]

Let me make one further remark before closing this list of instances of puerperal tetanus. Occasionally cases of death from tetanus after delivery are referred to in English official and tabular records, without any special details in regard to them being given. The following two or three instances are examples of this remark, and afford additional evidence of the fact that puerperal tetanus is not so very rare as the total silence of obstetric works on this subject might lead us *a priori* to suppose.

Case XXIII.—The late Dr. Merriman, in his *Synopsis of Difficult Parturition*, has published a table[3] of the causes of death in childbed, among 10,190 patients

[1] *Lancet* for 29th February 1840, pp. 821-852.

[2] Wachter's *Dissertatio de Articulis Extirpandis*, Gröningen, 1810.

[3] *Synopsis of Difficult Parturition*, p. 339.

attended by one physician. There occurred 107 maternal deaths in this long list of deliveries. One of these puerperal deaths is noted as having been produced by "locked jaw." But no particulars are given.

Cases XXIV. XXV.—From the Fourth Annual Report of the Registrar-General, it appears that, in the course of the year 1840, 140 of the inhabitants of England and Wales died of tetanus. The sex of the patients, in 116 of these cases, is given in the report. Of these 116 patients, ninety-six were males, and twenty were females. The causes which led to the attacks of tetanus, in this long list of cases, are, of course, not specified. But, incidentally, it is stated in the Report[1] that two of the deaths from tetanus occurred after parturition, "lock-jaw caused by childbirth" being reported in two cases in which the patients were aged "34 and 35 years." Thus, out of the twenty cases of fatal tetanus among females during that year, two at least, or 1 in 10, were cases of puerperal tetanus.

The relative frequency or rarity with which tetanus occurs in obstetrical, as compared with surgical practice, could perhaps be properly ascertained by an analysis of the official returns given in for a few years to the Registrar-General of all deaths from this disease. And certainly the investigation would form an interesting point of inquiry in puerperal pathology.

NATURE OF PUERPERAL TETANUS.

It will be granted, I believe, by all pathologists that the existence of an injury or wound upon the external parts of the body is by far the most common cause of tetanus. After abortion and parturition we have the existence, upon the interior of the uterus, of a similar state of lesion. All authorities seem now generally agreed as to the facts—(1) that the human decidua is, as was maintained in the last century by Krummacher,[2] the thickened and hypertrophied mucous membrane of the uterus; (2) that the epithelial or superficial layer of it separates from its basement, or outer, layer, in abortion and after delivery; and (3) that this separation or solution of continuity of tissue, as well as the rupture of the organic attachments of the placenta from the uterus, leaves the interior of this organ so far in the condition of an external wound, or with a new or raw surface for the time being exposed. Obstetrical tetanus has, in this respect, an exciting cause essentially similar to surgical tetanus. And perhaps the great reason why this state of lesion of the interior of the uterus does not more frequently give rise to tetanus is simply

[1] *Fourth Annual Report*, p. 224.

[2] Membrana decidua "proprie est membrana uteri interna, quæ post conceptionem intumescit et crassescit, usque ad tertium circiter graviditatis mensem, etc."—See Krummacher's *Dissertatio circa Velamenta Ovi Humani*, 1790.

this, that the uterus is itself principally, or indeed almost entirely, supplied by nerves from the sympathetic system, while apparently, as stated by Mr. Curling and other pathologists, tetanus is an affection far more easily excited by lesions of parts supplied with nerves from the cerebro-spinal system, than by lesions of parts supplied with nerves from the sympathetic system.

Tetanus is known to follow wounds very various in their degree and severity. "Whether," says Professor Wood,[1] "the wound is trifling or severe seems to be of little consequence," so far as regards the supervention of secondary tetanus. By what pathological mechanism a wound or lesion of a part can, under any circumstances, lead to an attack of tetanic disease, is an inquiry regarding which we as yet possess little information; and in this respect the production of obstetrical tetanus is not more obscure than the production of surgical tetanus.

The disease, when developed, essentially consists of an exalted or super-excited state of the reflex spinal system, or of some segment or portion of that system. What circumstances in midwifery or surgery might possibly, either singly or in combination, produce this state, and so produce traumatic tetanus? In relation to this question I will venture to make one or two hypothetical remarks.

1. We have in obstetric pathology evidence almost amounting to certainty that the analogous super-excitable state of the cerebro-spinal system of nerves which gives rise to eclampsia or puerperal convulsions is generally produced by the existence of a morbid poison in the blood. And it seems not impossible that the generation of a special blood-poison, at the site of the wound or elsewhere, may sometimes in the same way give rise to obstetrical and surgical tetanus. We know, indeed, that the introduction into the blood of particular vegetable poisons is capable of exciting an artificial disease quite analogous to tetanus.[2] Brucine and strychnine have both of them, as is well known, this effect. Abundant experiments upon the lower animals, and cases of poisoning in the human body, have

[1] *Practice of Medicine*, vol. ii. p. 746.

[2] Backer has shown that even after the spinal cord was divided in dogs, nux vomica, taken by the mouth, produced convulsions in the paralysed lower limbs, which it could only affect and reach through the blood.—*Commentatio*, etc., p. 139. On the other hand, Stannius found in the frog, that when the lower half of the spinal cord and its nerves was merely separated from all connection with the vascular system, no convulsions in the hind extremities followed the use of strychnine, while the anterior extremities were affected as usual.—*Untersuchungen über die Rückenmark*, etc., p. 50.

amply proved this.[1] Tetanus is a frequent disease from wounds, etc., in the horse and lower animals. Would it not, in relation to the possible humoral origin of the disease, be worthy of trial whether the blood of an animal dying of tetanus is ever capable by transfusion of infecting another animal with the same malady? The experiment is said to have succeeded with a disease having many analogies with tetanus—viz. hydrophobia. But—

2. We know further, with regard to the tetanising effects of strychnine and brucine, that these agents do not necessarily require to circulate in the blood in order to produce their special effects. In the lower animals, when strychnine or brucine is applied directly to the spinal cord, tetanic effects speedily follow;[2] and in all probability, when they are introduced into the blood, they produce their tetanising consequences, by being carried in the current of the circulation to the cord—thus toxicologically influencing it, as if they were primarily applied to it. Centric irritation, or centric morbid conditions of the cord (and, it may be, of the cerebro-spinal system), may lead, according to these experiments, to tetanic disease, independently of any morbid state of the blood. And, if the observations of Sims, Harrison, and others, are correct as to the occasional mechanical origin of *Trismus Nascentium* from pressure and displacement of the occiput upon the medulla oblongata, we have, in this obstetrical instance, tetanus resulting—as it certainly sometimes does under other circumstances—from direct injuries, or affections of the nervous centres.

3. The appropriate and specific affection of the spinal cord, or cerebro-spinal system, constituting traumatic tetanus, would appear to be sometimes, if not always, a condition excited by some influence propagated upwards along the nerves, from the seat of the injury or wound to the central portions of the nervous system. In

[1] See details in the works on Toxicology. Thus, in a boy poisoned by false Angostura bark, which contains both brucine and strychnine, Professor Emmert found that when "he touched the patient's arm, in order to feel his pulse, a sudden and violent *tetanic* spasm intervened; the eyelids opened wide; the eyes projected rigidly and immovably; the lower jaw was firmly compressed against the upper one; both lips separated from one another, so that the front teeth were exposed; the different muscles of the face were tense; the extremities were extended and rigid; and the spinal column and the head were violently drawn back."—Romberg's *Manual*, vol. ii. p. 129.

[2] In a number of frogs Stilling removed the heart, and, indeed, all the other viscera, and applied to the exposed spinal cord a drop of a solution of acetate of strychnine. All the animals thus treated were rendered tetanic in a few minutes. The tetanus was universal over the system.

proof of this, we have the fact that occasionally, as in cases published by Hicks, Murray, Larrey, etc., but not often, the artificial division of the nervous communication between the seat of the wound and the nervous centres has arrested the disease, when performed in a very early stage of the attack. What the nature of the transmitted influence may be, we have at present no means of judging. But we have analogies for the transmission itself in some of the phenomena of electrical induction and propagation. And, let me further add, that the symptoms of tetanus assimilate themselves very greatly to a rapid succession of electrical or galvanic currents transmitted peripherally from a nervous trunk or centre to the sets of muscles affected.

At the present time various physiologists are busy with recondite inquiries into the laws pertaining to the electro-motive powers of the nervous and muscular systems of the body. When our knowledge of these laws is more advanced, physicians will, perhaps, be able to deduce from them a more correct and true pathology of tetanus and other convulsive diseases.

TREATMENT OF PUERPERAL TETANUS.

According to Mr. Curling, tetanus is not only less frequent in women than in men, but it is also "*less fatal* in the female than in the male sex."[1]

Out, however, of the preceding list of twenty-four cases of obstetrical tetanus, only three recovered (Nos. XIV. XV. and XVI.); and these under opposite modes of management. There are two other cases on record of the successful termination of puerperal tetanus. The two instances I allude to have been reported by Dr. Symonds and Dr. Currie. The true tetanic character of both cases may perhaps admit of some doubt.

In his article on Tetanus, in the *Cyclopædia of Practical Medicine*,[2] Dr. Symonds of Bristol speaks of the first of these cases in the following words:—

> Case XXVI.—"We remember," says Dr. Symonds, "attending a young woman, who was seized with lock-jaw soon after delivery of a still-born and premature fœtus; but the affection readily gave way to a turpentine injection, and we looked upon it as a mere sympathetic accident."

The other case of recovery from puerperal tetanus, which I have adverted to above, is mentioned by the late Dr. Currie of Liverpool,

[1] *Treatise*, p. 29. [2] *Cyclopædia of Practical Medicine*, vol. iv. p. 874.

in an essay on the treatment of tetanus and other convulsive diseases by the cold bath and cold affusion, which he published in the third volume of the *Memoirs of the Medical Society of London.* In this essay he details six instances of tetanus. He gives the few following particulars regarding the puerperal case:—

Case XXVII.—A poor woman, "in consequence of difficult labour, and, as she imagined, of local injury in some part of the uterus, was seized with the *spasmus cynicus*, locked jaw, and other symptoms of tetanus. She was immediately taken to the cold bath, and thrown into it, with good effects. The spasms disappeared, and though they afterwards returned in a slight degree, they gave way entirely to a second immersion."

Supposing these two instances of recovery to have been instances of genuine tetanus, it would still appear, from the evidence of all the cases which I have collated, that puerperal tetanus is nearly as fatal as surgical tetanus, for, out of the whole twenty-six examples collected, twenty-one died and five recovered; or, the disease was fatal in the proportion of four out of every five persons attacked. Dr. Lawrie has calculated surgical tetanus to be fatal in seven out of every eight who are seized; but, like Mr. Curling, he believes surgical tetanus in females to be less fatal than this.

In such a communication as the present, it would be out of place to dilate on all the means usually recommended for the treatment of tetanus. Let me merely remark that, in obstetrical tetanus, no kind of local treatment to the seat of the original uterine lesion could be well applied, or would probably be of any avail, if applied. And, as to *constitutional* means, perhaps the most important are—

1*st*, The greatest possible quietude and isolation of the patient from all irritation, corporeal or mental, during the course, and for some time even after the resolution, of the disease.

2*d*, The special avoidance of painful and generally impracticable attempts at opening the mouth in order to swallow; but sustaining the strength of the patient, and allaying thirst, by enemata, or by fluids applied to the general surface of the body.

3*d*, If there is any well-grounded hope of irritating matters lodged in the bowels acting as an exciting or aggravating cause, to sweep out the intestinal canal at the commencement of the disease with an appropriate enema.

4*th*, To relax the tonic spasms of the affected muscles, and diminish the exalted reflex excitability of the spinal system by sedatives, or antispasmodics; with the prospect of either directly subduing this morbid reflex excitability; or of warding off the

immediate dangers of the disease, and allowing the case to pass on, from an acute and dangerous attack, to a subacute, and far more hopeful and tractable form of the malady.

Various sedatives and antispasmodics have been recommended to fulfil this last most vital and important indication in the treatment of tetanus—as belladonna, stramonium, hemlock, henbane, musk, camphor, Indian hemp, hydrocyanic acid, valerian, camphor, etc. Perhaps the two drugs of this class that have hitherto been most used, and most relied upon, are opium by the mouth, and tobacco by enema. But certainly we have no decided evidence of the beneficial effects of opium, even in the most heroic doses; and it seems doubtful even if this and other such medicines are readily or at all absorbed from the stomach and upper part of the intestinal canal in cases of acute tetanus. Tobacco in the form of enema has doubtless often acted most favourably in arresting the spasms; but it is a drug the action of which is not easily or safely kept up with that degree of constancy which is required in acute tetanus. Latterly, the antispasmodic action of sulphuric ether and chloroform has been repeatedly employed to allay that exalted state of the reflex nervous system, and to relax that resulting tonic contraction of the maxillary and other muscles, which constitutes the essence of tetanus. Medical men may yet discover therapeutic agents, to be introduced into the body by inhalations or otherwise, the action of which will be as directly anti-tetanic in their effects, as strychnine is directly tetanic in its properties; and such agents, if they were otherwise innocuous, would form the proper remedies for tetanus. Here, as elsewhere, in future, physicians will probably seek for therapeutic remedies in the same way, and upon the same principles, as toxicologists search for antidotes to poisons. Chloroform in sufficient doses acts as a direct sedative upon the reflex nervous system, and upon exalted muscular contractility. In consequence of this action, it affords us one of the surest and most manageable means of allaying common convulsive attacks; and it has now also, according to the reports in periodical medical literature, been repeatedly successful in the treatment of traumatic tetanus,[1] whilst it has apparently also repeatedly failed in subduing the more acute forms of the disease. Perhaps some of the failures

[1] See, for example, Dr. Ranking's *Abstract*, vol. ix. p. 239 (three successful cases); *British and Foreign Medical Review* for 1851, p. 464 (two successful cases), etc.

have arisen from the patient not being kept sufficiently deeply and continuously under the action of the drug. If used in tetanus its action will require to be sustained for many hours, or oftener perhaps, for many days. And there is abundant proof of the safety with which its continuous action may be kept up under proper care and watching. For instance, a few months ago I saw, with Dr. Combe, a case of convulsions of the most severe and apparently hopeless kind in an infant of six weeks. The disease at once yielded, and ultimately altogether disappeared, under the action of chloroform, which required to be used almost continuously for thirteen days; as much as 100 ounces of the drug being used during the period. After all tendency to convulsions at last ceased, the little patient rapidly grew, and is at the present moment a very strong, healthy child. In a case of the successful treatment of traumatic tetanus by Dr. Dusch, above sixty ounces of chloroform were employed.[1] Let me close these remarks with a case of puerperal tetanus treated with chloroform.

Case XXVIII.—In the following letter, dated 20th January 1854, Professor Lawrie of Glasgow has kindly communicated to me the encouraging results, so far as they go, of an example of the disease which is at present under his care:—

"Mrs. B——, a fine young woman, æt. 24, in the third month of her third pregnancy, miscarried on the 4th of this month (January 1854). She lost a considerable quantity of blood, and required plugging, cold, and pressure, but was so well on Sunday, the 8th, that I ceased my attendance. On Thursday, the 12th, she complained of stiffness about the neck and lower jaw, but not suspecting the nature of her illness, she did not send for me till late on Saturday, the 14th. I found trismus well marked—the spasm not extending beyond the neck—and the pulse nearly natural. Every attempt to swallow gave great pain, and produced a spasm in the muscles of the neck and larynx, which threatened instant suffocation. I forbade all attempts at swallowing, ordered nutritive enemata with 50 or 100 drops of laudanum every six hours, and pectra to the neck, with aconite and chloroform. There was little change till the night of Monday, the 16th, when the pulse had risen to 120, and the spasms had greatly increased, but had hardly extended beyond the neck; deglutition was impossible. I immediately exhibited chloroform, which acted admirably, and gave instant relief. I taught her husband and mother how to use it, and she has since been more or less constantly, and nearly continuously, under its influence. Thursday, 18th, the pulse was 96, and she swallowed with comparative ease. To-day, Friday, 20th, she is not quite so well; the pulse is 108, and abdominal muscles rather tense, and the rectum will not retain the enemata. For this last occurrence I was, of course, prepared; and, since the 15th, she has been carefully rubbed with oil, butter, and cream. She still swallows tolerably well. My *prognosis* in this case was from the first serious for although the pulse was natural, and the spasms had not extended beyond the neck, deglutition was nearly impossible, and suffocation was often imminent. One symptom I have forgotten, which is often one of the most distressing—a constant

[1] Ranking's *Abstract*, vol. xvii. p. 63.

cough from accumulated mucus, which cannot be raised or got rid of. In two days it has disappeared. I now anticipate recovery. The *treatment* has been negative, with the exception of the chloroform, which has been most useful. I attribute the improvement on the 17th and 18th entirely to it; and if Mrs. B. recovers, she will owe her life to your invaluable discovery."[1]

Even when not curative of tetanus, the use of chloroform has proved of no small service in relieving the sufferings and agonies of the patient. Thus, in a fatal case of puerperal tetanus already detailed in a preceding page (Case V.), the medical gentleman who drew up the case observes, "We had the just comfort of finding the paroxysms materially alleviated by chloroform, which was used during the last sixteen hours of the patient's life. 'Chloroform! chloroform!' was the poor sufferer's anxious exclamation whenever she felt the spasms impending, and comparative tranquillity speedily followed its application each time." Our practical power over the most rapid and fatal forms of tetanus perhaps amounts yet to little more than a "meditatio mortis." But even to alleviate the sufferings attendant upon such a dreadful disease, should we effect no more, and to produce a state of euthanasia, is surely an object worthy of the best-directed efforts of the medical art. "Physicians," says Bacon, "do make a kind of scruple and religion to stay with the patient after the disease is deplored; whereas, in my judgment, they ought both to inquire the skill, and to give the attendances for the facilitating and the assuaging of the pains and agonies of death."[2]

ON THE CAUSATION OF PUERPERAL MANIA BY ALBUMINURIA.[3]

In obstetric, as in medical practice, various cerebral and nervous complications have of late years been traced to the previous existence of albuminuria. Thus, many cases of convulsions, coma, amaurosis, etc., have been found to co-exist with and depend upon those morbid states of the system which are connected with the presence of albumen in the urine. In what exact pathological relation the albuminuria stands to these various complications, it

[1] Subsequently to the publication of this essay in the *Monthly Medical Journal* this patient sunk under the continuance of the disease.

[2] Montagu's Edit. of Bacon's Works, vol. ii. p. 166.

[3] See Proceedings of Edinburgh Obstetrical Society, session xvi., in *Edinburgh Medical Journal*, February 1857, p. 761.

was not Dr. Simpson's present object to inquire. But he wished to point out another morbid complication with albuminuria in the puerperal state, in order that the subject may be fully investigated as occasion occurs. In the last four instances of puerperal mania which he had been called to in practice, albuminuria existed at the commencement of the attack of each; and, when we see albuminuria in the parturient female so often lead on to convulsions and coma, we cannot be surprised at meeting with this other cerebral complication in connection with it. In one of these cases, puerperal convulsions occurred before delivery, with very marked albuminuria; and, after a short period of convalescence and absence of the albumen, acute puerperal mania set in, and the urine, on examination, again proved highly albuminous. In another of the cases, there were two sudden attacks of puerperal mania, with a week's interval between them. At the commencement of both attacks, the urine was charged with albumen, and in the interval was free from it. In such cases, we shall probably only find the albuminuria in a marked form, at or immediately after the commencement of the attack of mania; and the co-existence of sleeplessness, and albuminuria or its symptoms, should always put us on our guard against a maniacal attack. In the last case which he had seen, the puerperal mania lasted for two or three weeks—the albuminuria, which was at first well marked, disappearing before the restoration of the mental powers.

PERINEAL FISTULA

LEFT BY THE TRANSIT OF THE INFANT THROUGH THE PERINEUM.[1]

The length of the perineum in the adult virgin female is usually stated by anatomists to vary from one inch to one inch and a half; but it is very frequently found shortened in women who have borne a family, from the liability of its anterior portion to become more or less fissured and lacerated during the passage of the child's head and shoulders.

In consequence of the natural shortness of the perineum, it looks *a priori* almost impossible that the child and its appendages should ever be propelled directly *through* it during labour, while the orifices of the vulva and anus were left entire. But the state of the peri-

[1] See *Edinburgh Medical Journal*, July 1855, p. 1.

neum is very different in the stage of labour immediately preceding the expulsion of the child, from what it is in the non-parturient condition. By the time the child's head at last fully dilates the external parts in labour, the perineum is so stretched, that it has become thin and lacerable, while, at the same time, it is enormously increased and expanded in all its superficial dimensions. The perineum when thus distended by the child's head has been found to measure six inches in breadth, or from one tuberosity of the ischium to the other; and in length three inches or more from the posterior commissure of the vaginal orifice backward to the anterior commissure of the dilated and elongated orifice of the rectum; or as much sometimes as seven inches from the fourchette to the point of the coccyx. When the perineum is thus attenuated and expanded, like a thin cap placed upon the head of the child previously to its expulsion, it is easy to conceive that a fissure occurring in the centre of the stretched perineal structures would readily enough tear and extend under the strong expulsive efforts of parturition, so as to allow the head of the fœtus to pass through the accidental opening; and if the resulting lacerations assume, however irregularly, the forms of X, Y, or V, with their diverging lines passing somewhat on either side of, but without rupturing *into*, the orifices of the rectum behind, or the vulva in front, we may have the infant, cord, and placenta traversing the perineum, while the rectal and vaginal canals remain entire and intact.

Instances in which the infant and its appendages were thus born and expelled through a central aperture in the perineum, have been published by Nedey, Coutouly, Merriman, and various other accoucheurs; and references to most of the recorded cases of this singular lesion are to be found in the writings of Moreau,[1] Duparcque,[2] and Dr. Churchill,[3] upon the subject.

None of these authors specially allude to any examples of a fistulous opening remaining subsequently in the perineum, as a result and a proof of the perforation of it in the process of parturition. Such a result indeed appears to be very rare, in consequence of the edges of the lacerated wound almost always perfectly uniting, under common surgical care and treatment, subsequently to delivery. A preparation in the Obstetric Museum of the University of Edinburgh presents, however, an exception to this general rule, and is a well-

[1] *Revue Médicale* for June 1830; or, Moreau's *Traité des Accouchemens*, vol. ii. p. 462, etc.

[2] *Histoire des Ruptures de l'Utérus*, p. 368, etc.

[3] *Diseases of Pregnancy and Childbed*, p. 403.

marked instance of that rare lesion, viz. perineal fistula in the female.

Case I.—The patient was attended during her first labour by a practitioner in the west of Scotland. The labour—as he subsequently informed me—was tedious, particularly during the advance of the head through the lower part of the pelvis. After the perineum had become much stretched and distended by the child's head, and when the artificial support of it by the hand happened to be for a short time withdrawn, a very strong expulsive effort supervened, and the practitioner was recalled to the patient in consequence of her loud cries. To his surprise he found the head passing, or in fact, already nearly entirely passed through a rent in the perineum ; and the next pain expelled the body of the child through the same opening. Through this same perineal perforation, the cord and placenta were delivered. The sphincter ani and the anterior edge or fourchette of the perineum remained untouched. The sides of the laceration did not entirely unite. A year subsequently to her delivery, I saw her, along with the late Dr. Dawson of Bathgate, under whose care she had come with symptoms of phthisis. The perineal fistula still remained, and, as we found on a post-mortem examination some months subsequently, it was about the size of the barrel of a goose-quill. The opening was situated about half-an-inch behind the posterior commissure of the vulva. The perineum was very thin at the site of the fistula, and converging lines of old cicatrices were still visible on its mucous surface. But its anterior edge, or fourchette, was strong and dense, and placed unusually far forwards over the vaginal orifice.

I have only been able to find on record two other cases in any way analogous, of perineal fistula originating in perineal perforation during labour. They are described by Marter of Kœningsberg[1] and Halmagrand[2] of Paris.

Case II.—In a primiparous woman, to whose assistance Marter was summoned by a midwife, he found the head of the child already passing through a central laceration in the perineum. The child was speedily pushed by the strong pains that were present through the abnormal aperture, and the placenta afterwards followed through the same crucial-shaped laceration. Inflammation of the lips of the wound subsequently occurred, and, despite of the use of ligatures, a perineal fistula remained, by which the menses escaped during the two subsequent years. She then again became pregnant ; and this second child was born naturally by the vulva.

Case III.—In 1838, a patient applied to Halmagrand, some time after delivery, with a perineal perforation not yet cicatrised, and forming a communication with the vagina. He cut the anterior bridle of the perineum, which was slender, made raw the edges of the fistula, and brought them together by the apposition of the thighs alone. Reunion and cicatrisation took place in a few days. The patient was subsequently confined without any renewal of the perineal lesion.

To the preceding remarks, let me merely add that, as a means of preventing central perineal laceration, and the chance, consequently, of perineal fistula as a result, we have to trust to—1st.

[1] Siebold's *Journal für Geburtskunde*, vol. ix. p. 726.
[2] *Démonstrations des Accouchemens*, p. 577.

The common methodic manual support of the perineum, so as to save excess of pressure upon it while at the same time we push the head forward to the vaginal opening—a means which, in the practice of Denman and Lachapelle, succeeded in preventing the child's head from passing through the perineum, after its central structures were split and burst; 2d. Delivery of the head, and its proper guidance through the vulva by the forceps, as has been effected by D'Outrepont, Hüter, and Braun, in cases in which this accident was impending; and, 3dly. Lateral incisions, if absolutely necessary, of the interior edge of the perineum; for in this, as in the more common longitudinal forms of ruptured perineum, it is, I believe, better practice to make one or two slight cuts on either side of the fourchette, so as to regulate the site and direction of the lacerations that must occur, rather than leave their form and their character to mere chance alone. It is always an infinitely more important matter to save the sphincter of the anus than the sphincter of the vagina.

MORBID DEFICIENCY AND MORBID EXCESS IN THE INVOLUTION OF THE UTERUS AFTER DELIVERY.[1]

The enormous increase which occurs in the parietes of the uterus during the nine short months of pregnancy has long attracted the attention of professional observers. It is a kind of physiological hypertrophy unequalled, either in regard to its magnitude or its rapidity, in any other organ in the adult human body. For, during the forty weeks of utero-gestation, the uterus enlarges from nearly 3 inches in length and $1\frac{3}{4}$ of an inch in breadth, to 12 or 15 inches in length and 9 or 10 inches in breadth. It increases from about 2 ounces in weight to 25 or 30 ounces. The cavity of the uterus before impregnation is less than one cubic inch, while at the full term of pregnancy it is extended to above 400 cubic inches; and the surface of the organ increases from about 5 or 6 square inches to nearly 350 square inches. Before impregnation, the uterine cavity would not hold above a drachm or two of fluid; at the ninth month of utero-gestation, its contents usually weigh from 120 to 150 ounces.

The rapidity, however, with which the uterus diminishes in size after delivery, is perhaps still more marvellous than the rapidity

[1] Read before Edinburgh Obstetric Society, February 11, 1852. See *Edinburgh Monthly Journal of Medical Science*, August 1852, p. 127.

with which it increases in size after impregnation. The celerity of its involution in the puerperal state is in fact more striking and remarkable than the celerity of its evolution during the pregnant state. If the process of absorption of organs in the adult is ever studied successfully anywhere, it will probably be by making observations on the reduction or involution of the uterus in women or in the lower animals subsequent to parturition.[1] Whilst the human uterus takes forty weeks to attain the dimensions pertaining to the fully developed state of pregnancy, it requires only, on the contrary, from four to eight weeks to decrease from the extreme size of the organ peculiar to pregnancy, down to the small size peculiar to the same organ in its unimpregnated condition.

But in the vital mechanism of the involution or reduction of the uterus after delivery, various pathological derangements are liable from time to time to occur. This, like every other process in the animal economy, is apt, for example, to fail, either in the way of defect or of excess. Some years ago, I endeavoured to point out to my professional brethren, that occasionally, as one of the derangements in this mechanism of involution, the uterus is morbidly slow in regaining its original dimensions—its involution becomes impeded or arrested—and the organ is in consequence liable to be found, weeks or even months after parturition, still so large and unreduced, as at first to be readily mistaken for a tumour of the uterus or ovary. I described this peculiar condition of the puerperal uterus, under the name of "Morbid Permanence of the State of Puerperal Hypertrophy,"[2] and illustrated it with the following example:—

Case I.—During the summer of 1842, I attended, along with Dr. Abercrombie, a lady, who, after a premature confinement in the country, had suffered from a smart attack of puerperal fever. After so far recovering for a few weeks, she was sent from a considerable distance into town, to be treated for what appeared to be a large tumour, stretching upwards from the pelvis into the right iliac region. The tumour had not been observed before delivery, and was somewhat painful to the touch. It seemed at first sight extremely doubtful whether the mass consisted of an inflamed uterine fibrous tumour, or enlarged ovary, or of one of those chronic purulent collections which are apt to form towards one or other iliac region in

[1] In the Swedish Hygieia of last year, my friend, Professor M. Retzius of Stockholm, published some interesting observations on the process by which nature effects the reduction of the puerperal uterus. He found, in a series of anatomical and histological observations on the subject, that the process of absorption of the walls of the puerperal uterus was preceded, as absorption of other deposits is, by fatty transformation of its component fibres; and that the blood during puerperal convalescence shows under the microscope a corresponding superabundance of globules or granules of fat.

[2] See Memoir on the Uterine Sound, p. 632.

connection with puerperal fever or inflammation. The uterine sound, when introduced into the os uteri, passed easily and directly upwards for several inches to the superior end of the tumour, and its apex could be felt there by the hand placed externally. This at once showed the supposed diseased mass to consist of the enlarged uterus. Further examination proved that there was nothing strictly abnormal about the uterus, except its great size. In fact, it was a case where the organ had apparently remained nearly undiminished after delivery, probably from the puerperal attack arresting the usual progress of its absorption and diminution. It decreased rapidly and fully under leeches and other local antiphlogistic treatment.

In alluding to the pathological state of the uterus, of which the preceding case is a well-marked example, Dr. Lever has adopted the same designation which I originally applied to the affection.[1] More lately (1851), Dr. Snow Beck described to the London Medical Society a case of this malady, under the simple term of "A New Disease of the Uterus."[2] On examining microscopically the structure of the hypertrophied uterus in this instance, no inflammatory or heterologous deposits could be detected; but the tissue of the organ was, it is stated, similar in its histological characters to the tissue of the uterus at the ninth month of pregnancy, except only that its component muscular fibres were smaller in size, or like those of a uterus at the middle period of utero-gestation.

Retarded involution or reduction of the uterus after delivery is not unfrequent in its less marked degrees; especially when inflammatory or febrile action supervenes and interferes with the phenomena of the puerperal state. It is often, for example, observable both during life and after death, in women who are the subjects of puerperal fever, pelvic cellulitis, and phlegmasia dolens. Chronic hypertrophy of the uterus in any excessive degree, from morbidly retarded or arrested involution, is more rarely met with. I have sometimes, however, seen it ten or twelve weeks subsequent to delivery, in the form of an apparent tumour, twice or more the bulk of the normal uterus. In lesser, though still sufficiently remarkable degrees, it often persists for many long months, or even years, after parturition; particularly when combined, as I have repeatedly found it, with anteflexion or retroflexion of the fundus uteri, or with the state of prolapsus.

The day after (July 18) the preceding remarks were written, I saw with Dr. Retzius the following instance of this combination of retarded involution with retroversion of the uterus, in a lady, who came for advice from the north of England.

[1] *Guy's Hospital Reports*, vol. ii. 1844, p. 17.

[2] *Lancet* for 19th April 1851, p. 447.

Case II.—The patient, aged 28, and married for three years, was delivered of her first child two years ago. She was so well as to be allowed to leave her bed at the end of a fortnight. The lochia, however, were very abundant, and continued for eight weeks. She nursed her child for seven months, and during this period of lactation the menses recurred, as they have done since, regularly, profusely, and each month somewhat prematurely. She complains of pain of the back, weakness, etc. In making a vaginal examination, the body of the uterus, which is retroverted, feels large and heavy, like a uterus at the third month of pregnancy. Its cavity is, as appears by examination with the sound, nearly an inch greater than the natural length. The cervix is large, and fills entirely the extremity of the largest-sized speculum. Its surface is red and congested, but presents no appearance whatever of abrasion or ulceration. The os is unusually patent, and admits the tip of the finger for about half-an-inch. The lining membrane of the cervical cavity feels, with the os, hypertrophied, and thrown into prominent folds, and some of the Nabothian glands are much enlarged. The hypertrophied body and fundus of the uterus seem quite free from fibrous tumour, or any other heterologous disease.

Sometimes hypertrophy of the uterus, from arrested reduction or sub-involution of the uterus, follows upon abortion or premature labour. I have at present the following instance under my care :—

Case III.—The patient, æt. 35, and the mother of six living children, had a premature labour on the 11th December 1851, under the charge of my friend, Dr. Dickson of Bathgate. The labour came on about the fifth or sixth month of pregnancy, and was in itself simple and easy. The convalescence, however, proved slow and imperfect ; and she was indeed in a great measure confined to bed for three or four months afterwards. The lochial discharge stopped on the second or third day. Menstruation has recurred regularly, but with some degree of menorrhagia. There is slight leucorrhœa. The uterus feels heavy and hypertrophied when examined per vaginam, but without any organic disease in its walls. The cervix is also much enlarged, particularly the anterior lip, which is considerably thicker than the posterior. Immediately around the os there is a line or two of granular ulceration. The uterine cavity measures between three inches and three inches and a half.

The preceding instances and remarks refer to deficient, impeded, or arrested involution. But a morbid *excess* of involution or reduction in the uterus after delivery (*super-involution*) is still more rare than a morbid *defect* in it (*sub-involution*) ; and I am not aware that hitherto any obstetric pathologist has described the former as a diseased state of the uterus. The following remarkable instance of such super-involution, as ascertained both during life and by dissection after death, has lately fallen under my notice :—

Case IV.—The subject of this rare pathological affection began to menstruate at the age of thirteen ; and the catamenia recurred regularly every four weeks till she became pregnant when eighteen years old. Utero-gestation went on without any unusual phenomena to the full term ; and her parturition was natural but

tedious, a male child being born after a labour of seventeen hours. Nothing unusual occurred during her puerperal convalescence and lactation. But subsequently to delivery she never menstruated. She was, however, subject to frequent attacks of diarrhœa, which she herself believed to be generally most severe at recurring monthly intervals; and the dejections were then sometimes tinged with blood.

Two years after her accouchement, she became a patient in the female ward of the Royal Infirmary, complaining of the state of amenorrhœa, with attendant broken health. She suffered from pain in the back and hypogastrium, with a sensation of weight and pressure in the pelvic region; dysuria; a furred tongue; and a weak compressible pulse, generally beating from 80 to 90 in the minute. She was thin, feeble, and anæmic in appearance. The mammæ were shrunk and flat. For some time before admission she had suffered much from occasional headaches and giddiness; frequent nausea and vomiting; palpitation and occasional rigors.

On making a vaginal examination, I found the uterus small and mobile. The cervix uteri was much atrophied, and the vaginal portion of it scarcely made any projection into the canal of the vagina. The os uteri was so much contracted as to admit a surgeon's probe with difficulty. It was dilated by a slender bougie being left in it for two or three days; and, when the uterine sound was subsequently used, the uterine cavity was found to be only one and a half inch in length, or about an inch less than normal.

A variety of means were employed with the view of benefiting the general health of the patient, and of exciting action in the uterine system, but with little or no effect.

Diarrhœa repeatedly occurred during the three or four weeks she remained under my care, requiring the free use of opiates for its restraint; and as the uterine symptoms did not at the time seem to admit of special attention and treatment, the patient was transferred to one of the general wards of the hospital, where she was placed under the care of my colleague, Dr. Bennett.

During the following month, the diarrhœa recurred from time to time very severely. At last, anasarca in the lower extremities and albuminuria supervened; ascites followed; and shortly afterwards her face and arms became œdematous. About a month after these symptoms appeared, delirium at last came on, the fæces passed involuntarily, and ultimately she died in a state of prolonged coma.

On post-mortem inspection, some crude tubercles were found in both lungs—especially in the left. The liver was enlarged, and showed some fatty transformation. The kidneys presented also some stearoid degeneration; and in the right there was, in addition, a small tubercular abscess. The large intestines were very much thickened in their parietes, and contracted in their calibre; while their mucous membrane was ulcerated in various parts. Along the lower end of the ileum several large ulcerations were seen running circumferentially around the interior of the bowel. One or two ulcerations were also found in the stomach. The uterus was very small, and atrophied in its length and breadth; its size being diminished about a third below the natural standard in all its measurements; and its parietes were correspondingly thin and reduced. The whole length of the uterine cavity from the os to the fundus was not more than one inch and a half, while the normal uterus usually measures in this direction two inches and a half. When a section was made of the posterior wall of the organ, the thickness of its parietes at their deepest or most developed point was not above three lines, instead of the normal measurement of five or six lines. The tissue of the uterus appeared dense and fibrous, and the section of it presented the orifices of numerous small

Fig. 19.

vessels. The ovaries seemed also much atrophied, and smaller than natural. Their tissue was dense and fibrous, and presented no appearance of Graafian vesicles. There was no inflammatory deposit on the peritoneal surface of the uterus or its appendages ; but some thick pus, or tubercular matter, existed in the distended cavity of the right Fallopian tube.

The woodcut on the preceding page presents the uterus and upper part of the vagina, the broad ligaments, and ovaries, of the exact size which they presented, and their degree of atrophy may be easily judged of by comparing the sketch with the same parts when of the normal size. The sketch represents the posterior surface of the uterus and broad ligaments, with the uterine cavity exposed, in order to show the diminished thickness of the parietes of the viscus. The whole parts represented in the woodcut weighed only one ounce, four drachms, twenty-five grains, in apothecaries' weight.

In females, subsequently to the cessation of the menses, the uterus, along with the ovaries, undergoes a slow but marked reduction in size. The uterus in this way, in some extreme instances, recurs subsequently to menstruation nearly to the small dimensions appertaining to it previously to puberty ; it becomes atrophied and shrunk in all its measurements and dimensions ; the vaginal portion of the cervix can be specially felt flattened and reduced in size ; and occasionally the canal of the cervix, especially at its upper part, is found so contracted as not to admit of the passage of a probe. This form of senile atrophy of the uterus is doubtlessly connected with the natural suspension of the functions of the reproductive organs ; and in this respect is so far similar to the results which we sometimes see in other viscera, as the testes, when the functions of these viscera are arrested in the course of nature, or when they happen to be prematurely suspended by chronic inflammation, or other forms of disorganising disease.

The principal peculiarities in the instance of the marasmus, or atrophy of the uterus, which I have detailed, are twofold :— 1. The occurrence of the affection in a very young female, as a consequence of pregnancy and parturition ; and 2. The excessive degree of that atrophy or super-involution—the uterus being, as we have seen, reduced fully a third in size below its natural dimensions.

During the last few years I have seen a number of cases of permanent amenorrhœa connected with an atrophied, or rather

undeveloped condition of the uterus. In these cases the cavity of the uterus generally measures from one and a half to two inches in length, as ascertained by the use of the uterine sound; the shrunk cervix usually projects but slightly into the cavity of the vagina; and the opening of the os is small and contracted. In these cases the uterus has apparently not taken on its usual degree of evolution and growth at the period of puberty. The organ, by a kind of malformation from defective development, as teratologists would describe it, retains after the date of puberty the type and size which normally pertain to it in the state of girlhood. But the particular case of undersized uterus which I have described in the preceding paragraphs is quite different from these; for in it the uterus, after being fully developed at puberty, and after performing normally the several functions of menstruation, pregnancy, and parturition, returned, as it were, suddenly to the type peculiar to the organ antecedently to the commencement of menstrual life; or, perhaps, we may more correctly say, it assumed, at the early age of nineteen, by an excess of the natural involution or absorption pertaining to the puerperal state, a degree of anatomical atrophy of its structures, and physiological arrestment of its functions, such as does not occur normally till the age of forty-five or fifty; and even then, at that advanced period of life, the degree of physical reduction in the size of the organ only rarely becomes so very great as was observed in the case which I have detailed above.

The case itself affords no precise data for determining whether the atrophy of the ovaries and uterus stood to each other in any respect in the relation of cause and effect; or whether they were both simultaneous results of one common agency.

Instances from time to time occur, in which, as in the preceding case, permanent amenorrhœa follows parturition. It will not, of course, be found that all such instances depend upon excess in that process of natural absorption or involution which follows upon delivery. But the case in question shows that this super-involution of the uterus may be expected to be met with, in some instances, in connection with this type of amenorrhœa.

At present I see professionally, from time to time, a case in which amenorrhœa has followed parturition, and in which the uterus is also reduced below its natural size. The following are the principal points in its history:—

Case V.—The patient, now aged 30, has been married ten years. She has borne three children. From the time of her third labour, which occurred four

years ago, no menstruation has recurred. The catamenia thus ceased at the age of twenty-six. After this third labour she made a good recovery, and left her bed on the eighth day. She nursed the child for fourteen months. I first saw her about two years subsequently to the birth of her last child. She then supposed herself to be again near her confinement; but the case was only a marked example of spurious pregnancy. The uterus, instead of being enlarged, felt looser and smaller than natural; and the vaginal portion of the cervix was specially reduced below the natural standard in length and breadth. The cavity of the organ was somewhat diminished below the usual length, and did not allow the stem of the sound to pass up to quite two inches and a half. In this patient the mammæ are flat and atrophied; and she is thin, weak, pale, and impaired in health and strength.

Sometimes super-involution of the uterus follows abortion, or premature labour. During the present month, I have had placed under my care an instance of this complication, in a patient from Canada.

Case VI.—A mother of eight living children, now aged 35, had, on the 29th July 1851, a dead premature child, about the sixth or seventh month, under the charge of Dr. Campbell. Nothing occurred to impede her convalescence. Before, however, her confinement, her health was not so good as usual, and she was disappointed to find it remained so after delivery. She has only once seen the catamenia during the past twelve months—viz. in September. There is slight leucorrhœa. She is anæmic and chlorotic, with palpitation, etc. The mammæ, which, she states, were previously very full and large, are now shrunk and flaccid. The uterus is of nearly its natural length, but the vaginal portion of the cervix is very short and atrophied, with the lips somewhat everted. The superior portion of the cervix, above the reflection of the vagina, can be felt small, firm, and cylindrical; and the body and fundus of the uterus, when grasped between the left hand placed above the pubes, and the two first fingers of the right hand introduced per vaginam, appears under examination unusually mobile and slender, and altogether reduced below the usual standard of size.

PART VI.

NON-PUERPERAL DISEASES OF WOMEN.

MEMOIR ON THE UTERINE SOUND.[1]

SECTION I.[2]

PROPOSITIONS REGARDING UTERINE DIAGNOSIS.

THE symptoms by which the diseased states of the various individual organs of the body are detected and discriminated from each other, are divisible into two great classes. The first class, forming the Functional, Dynamical, or Rational symptoms of various pathological writers, includes all the ascertainable derangements of functions, local and sympathetic, that may be present; the second class, constituting the Physical symptoms of the same authors, comprehends all the ascertainable circumstances connected with the structure, density, form, and other anatomical conditions of the organ which is the primary seat of disease.

Our diagnosis is always the more exact and perfect the more we can combine the information that may be gained from both classes or sets of symptoms—and especially the more that we can manage to confirm or correct the knowledge derivable from our study of the functional symptoms, by ascertaining, by the cognisance of our own senses, the exact physical state of the affected organ with which these symptoms happen to co-exist.

In morbid affections of the exterior parts of the body, the Physical Diagnosis of the disease can be in general easily accomplished, by the direct tactile examination and visual inspection of the affected organ. It is this facility of examination and inspection which renders the diagnosis of these more external diseases, which

[1] Read before Medico-Chirurgical Society of Edinburgh, April 19, 1843.

[2] See *London and Edinburgh Monthly Journal of Medical Science*, June 1843, p. 547.

belong to the province of the surgeon, so much more precise and accurate than the discrimination of those maladies of the more internal parts of the body, that fall under the investigation of the physician.

Within the last half-century, however, the diagnosis of the diseases of the deeper-seated organs has been very greatly advanced by the application of various measures to improve our knowledge of their existing structural states. In fact, the medical science of the present day owes its superiority over that of an earlier date to no circumstance more, than to the increased degree of attention that has, for a considerable time past, been devoted to the study and improvement of Physical Diagnosis. As the knowledge of the structural lesions which the various organs may undergo from disease, has of later years extended in the hands of the pathological anatomist from his examination of the body after death, the practical physician has, for the purposes of his diagnosis and the guidance of his treatment, exerted himself in discovering means of detecting these same morbid alterations during the lifetime of his patient, and thus of studying, if I may so speak, necroscopic anatomy upon the living body. It is true that, in the discrimination of the diseases of some organs, as of the brain or spinal cord, we are, with some slight exceptions, obliged to trust entirely to the functional symptoms, because we have no means of detecting the morbid states of these organs except in the derangements produced in their functions. Hence arises the occult character of this class of diseases. In the diseases, however, of other organs, as those of the chest, the fact is different. Formerly the affections of the thoracic organs were also, as those of the head still are, detected and distinguished by their functional symptoms and derangements only, and their diagnosis was consequently always more or less doubtful, and often exceedingly obscure. Now that we can ascertain, with so much precision, the existing anatomical state of the lungs and heart, by auscultation, percussion, etc., and thus combine the physical with the functional diagnosis of pulmonary and cardiac diseases, much of the difficulty and obscurity that was formerly connected with their detection and discrimination has entirely disappeared.

In ascertaining the Diseases of the Uterus, we have it in our power to avail ourselves of both the classes of symptoms of which I have spoken; or, in other words, we may form our judgment of its morbid conditions, both by studying the vital Functional Derangements, local, sympathetic, and constitutional, that may be

present; and by informing ourselves, by Physical Diagnosis, of the exact existing state or states of the organ itself. Each of these classes of symptoms may afford us most important information; and in all cases where both can be had recourse to, our diagnosis will be greatly more certain under their combined evidence, than if the data furnished by either were alone trusted to. Of the two, if we are to make comparisons between them, the physical symptoms are assuredly, in most cases, by far the most valuable and trustworthy; and yet in the common course of medical practice, the testimony which they are capable of affording, is but too frequently neglected and overlooked—and the functional and much less faithful class of symptoms alone relied upon, as well in forming the diagnosis, as in directing the measures of treatment.

Thus, if we attempt to analyse the mode in which the medical practitioner usually endeavours, in any suspected case of uterine disease, to detect the presence and character, or ascertain the absence of such an affection, we shall find, I believe, that he generally proceeds by taking into consideration some or all of the following sources and varieties of information:—

First, The local and functional state of the uterus, so far as it is indicated by the quantity, character, periodicity, etc., of the menstrual and mucous secretion of the organ; by the occurrence or non-occurrence of morbid uterine or vaginal discharges, as blood, serous fluid, pus, etc.; by the existence or not of morbid sensations in the region of the uterus, such as different modifications of pain, intermittent or continuous, feelings of heat, weight, tension, bearing down, etc.; and, if the patient be married, by the reproductive powers of the organ, as shown by sterility, by the recurrence of abortions, etc.

Secondly, The presence or absence of various morbid affections of the neighbouring viscera, particularly of the rectum and bladder, and of branches of the vessels and nerves passing through the pelvis —as indicative either of their sympathetic irritation or of their mechanical compression by the enlarged or displaced uterus.

Thirdly, The existence or non-existence of secondary local neuralgic pains in the mammæ, along the lower extremities, in the loins, and at points along the course of the spinal column, in the parietes of the thorax or abdomen on one or other side, and especially under the left breast, and under the margin of the ribs, along the colon, etc., increased in their intensity by any causes of increased action in the uterus itself, by the erect posture, by menstruation, etc.

Fourthly, The state of the general constitution of the patient, as marked by various degrees of deviation from the standard of health—and especially by the supervention of nervous, hysterical, dyspeptic, chlorotic, or cachectic symptoms.

The several preceding series of morbid phenomena consist of derangements in the vital actions of the uterus—or of other parts and organs secondarily affected—or of the constitution at large—and so far strictly belong to the class of Functional or Dynamic symptoms only. Up to a late date in the history of uterine diagnosis, most practitioners remained, and some still remain, satisfied with the degree of knowledge which is afforded by the above sources of information. No one, however, who is practically acquainted with the diseases of the uterus can have any hesitation in declaring that the symptoms derivable from these sources are utterly inadequate, in the general routine of such cases, for the purposes of correct diagnosis, and are constantly liable to lead into fallacy and error when their individual evidence is alone trusted to. In making this observation, I do not mean to allege that these classes of symptoms are not sufficient to give us the power, in most, though not in all, instances, of detecting the actual presence of uterine disease. They are perfectly deficient, however, in this other point, that, by their single unassisted aid, we cannot ascertain what the exact character and nature of the existing disease is—nor, consequently, what may be the proper line of treatment requisite for its alleviation or removal. They may generally, in other words, enable us to decide that the uterus is the seat of some morbid condition, but are not adequate to inform us what that morbid condition really is. They may show that the organ is affected, without showing us how it is affected.

If we attempted to throw the generalities, regarding the diagnosis of uterine diseases, into propositions, we would, therefore, be inclined to lay down the following as our

FIRST PROPOSITION.

The General and Local Functional Symptoms of disease of the Uterus are such as enable us to localise, without enabling us to specialise, the exact existing affection of the organ.

One or two instances may serve to illustrate and impress, more strongly than any mere abstract statement, the force and truth of the above proposition.

In the changed and changing state of the uterus during pregnancy, we have in all cases a constancy in the primary site and character of the existing irritation—if we may apply a term so far pathological, to a state which, in its object at least, is strictly physiological. But though in the pregnant female the local uterine irritation is constantly and specifically the same in its source and nature, the local and constitutional phenomena or Functional Symptoms to which it gives rise, are well known to vary infinitely in different individuals, and even in the same individual in different pregnancies. In one case, the health of the woman remains in all respects unimpaired, notwithstanding the altered condition of the uterus. In a second, we find her suffer from distressing local symptoms, such as weight, distension, and bearing-down sensations in the interior of the pelvis, derangements in the state of the bladder and rectum, œdema and stiffness in the lower extremities, etc. In a third, the local affections may be slight or altogether absent, but there may be severe and even serious sympathetic affections of the general constitution, or of particular and distant organs, such as of the stomach, with cardialgia or vomiting, or of the brain, with headache and sleeplessness, or even with convulsions or mania.

Again, in other instances, we occasionally find all the usual symptoms, both local and constitutional, of pregnancy present, in so marked a degree, as to impress both the patient and the practitioner with the certainty of the existence of that state; and yet these symptoms may all, after a short time, be found dependent on the irritation produced by some subacute functional or organic disease of the uterus that has no relation whatever to utero-gestation, except in the identity of its primary seat, and in the similarity of the symptoms to which it gives rise.

The few well-known facts to which I have thus adverted directly point to the two following important deductions:—1st, That in pregnancy we have the same identical condition of the uterus, not always accompanied by the same identical symptoms; and 2d, That the usual concourse and succession of functional phenomena to which pregnancy generally gives rise, may be induced by other states of the organ than the state of utero-gestation.

The same two important inferences are true in regard to the various individual morbid affections of the uterus. The marked uncertainty which exists regarding the effects produced by the condition of the organ in *pregnancy*, holds equally good regarding the effects produced by it in its different states of actual *disease*. In

uterine disease, as in pregnancy, the same specific affection of the organ excites sometimes very different phenomena in different cases; and the same specific phenomena frequently result from affections of the organ that are entirely at variance with each other in their pathological character, in their course, and in their treatment.

Probably the most common organic disease of the uterus consists in the development of those fibrous tumours which are so frequent in the tissues of the body and fundus, and so rare in those of the cervix of the organ. These tumours do not, in some cases, occasion any very decided symptoms, and are often, as I have repeatedly known, only accidentally discovered in the living subject, after reaching a very large size; or, as frequently happens, they are not suspected or detected before they are found on the post-mortem examination of the body. I have one such tumour in my museum, which weighed fourteen pounds, and where the principal or only symptom during life was the mere enlargement of the lower portion of the abdomen, produced by the presence of this great mass. But in other cases, these fibrous tumours of the uterus, even when still small, often produce distressing irritation among the pelvic viscera, and derange in various ways the physiological function of the organ —producing sometimes diminution or suppression of the menstrual secretion, or again, especially when they are situated near the mucous surface, inducing leucorrhœa and attacks of menorrhagia, that are occasionally most formidable, both from their severity and permanency. But the remarkable circumstance with regard to this, and almost all other structural diseases of the uterus, is, that though the walls of the organ be the seat of extensive morbid transformations and deposits, the menstrual secretion frequently remains so regular and normal as to deceive both the patient and her medical attendant; and I have known conception—the principal physiological function of the uterus—to take place, not only where fibrous tumours were present, but, in more than one case, where the cervix of the organ was the seat of malignant disease, that destroyed the patient shortly after her abortion or delivery.

Let us consider for a moment one other instance, illustrative of the important practical fact that the same organic disease of the uterus is often attended by the most varied, and even apparently opposite, sets of external symptoms.

Scirrhous degeneration of the cervix uteri is an affection constantly occurring in the course of practice. This disease sometimes gives rise, at an early period of its progress, to severe pains and

sufferings in the uterine region; to great local irritation of the bladder and neighbouring parts; and to the supervention of marked sympathetic and constitutional phenomena. In other numerous instances, however, it marches onwards to an advanced stage without occasioning almost one single symptom in the way of local pains, discharges, or otherwise, calculated to rouse the attention of the patient to the impending work of destruction that is, with slow but fatal steps, going on within her. I have repeatedly seen cases of the kind where the disease was under assiduous treatment for simple leucorrhœa or menorrhagia, merely because no examination had been instituted in order to learn upon what local states the leucorrhœa or menorrhagia depended. In other cases the intensity of the sympathetic or secondary symptoms may be such as to conceal and disguise entirely the primary disease. In an instance of fatal carcinoma uteri that occurred lately in this city, the symptoms complained of during the lifetime of the patient were entirely referred to the urinary, and not to the uterine organs. I have known the mammæ most actively treated by leeching, etc., for the sympathetic pains present in them, while the state of the uterus itself (the primary cause of the pains) was altogether held out of view, until at last, when attention was ultimately called to it, its whole cervix was found utterly destroyed by cancerous ulceration.

While we thus not unfrequently find the most malignant organic diseases of the uterus more or less latent or marked in their symptoms, we have, on the other hand, sometimes the most severe local and constitutional symptoms of uterine disease developed in instances of slight and remediable organic affections of the part, as in cases of simple Ulcerative and Granular Inflammation of the cervix; and these symptoms may be all present in their most aggravated forms for months and even for years, where the local examination and final result show us that there is certainly no organic disease whatever, as in cases of "irritable uterus," or hysteralgia. Indeed, in some females, we have all these symptoms strongly but temporarily excited at every recurrence of the catamenial discharge, in connection merely with that congestion and increased vital activity of the organ which accompanies its natural menstrual secretion.

We may meet, in short, with the same train of local and secondary functional symptoms indicative of uterine disease, in neuralgic, in congestive, in inflammatory, and in malignant diseases of the organ; and whether we explain it by the slowness with which morbid depositions are apt to develop themselves in this organ—by

the slight sensibility of the component tissues of the viscus—or by the intermittent and latent nature of its vital actions—there can be no doubt of the fact, that there seems to be no organ in which there is a less strict relation observable between the intensity and character of the existing pathological disease, and the intensity and character of the accompanying symptoms, or between the exact nature of the structural lesions that are present, and the exact combination and succession of functional derangements to which they give rise. Hence, in order to form in any case a correct diagnosis in regard to the existing state of the uterus, it is necessary to ascertain, as far as possible, if any anatomical alterations may be present in the structure and organisation of the organ—as well as in its physiological functions—and what these alterations are. In other words, we must institute a local examination of the organ itself, by the sense of touch, and, if necessary, by the use of the speculum. It is assuredly only by doing so, that we can hope with any certainty to decide upon the specific nature of the uterine disease that may be present. We may make the general diagnosis of the existence of uterine disease, by the consideration of the functional derangements to which such disease gives rise. We can only make the *differential* diagnosis of what the specific disease really is, by aiding this by the examination of the structural condition of the organ itself.

In deciding upon the existence or non-existence of pregnancy, especially in any cases of importance or doubt, no medical man, who valued his own professional character, would deem himself justified in offering a final and dogmatic opinion, from the mere functional symptoms only, which we have already seen to be sometimes very equivocal—nor would he venture to form a definite judgment until he had made a sufficiently accurate physical examination of the state of the uterus itself. In deciding in the same way upon the pathological nature, and consequently upon the line of treatment which any marked uterine disease may require, we believe exactly the same caution to be necessary, and the same local examination to be demanded, where there exists any doubt, and where the examination is not otherwise counter-indicated. The local examination of the uterus is had recourse to, in the case of pregnancy, to settle a point which time itself would alone ultimately decide. The local examination is had recourse to in the case of uterine disease, for an object of much more immediate and practical moment—namely, to obtain that information which can alone enable us to

form a proper and precise judgment of the nature of the case before us, and to select the proper remedial measures for its mitigation, arrestment, or timely removal. We have seen some unfortunate cases, where its unwarrantable omission in the earlier and curable stages of disease has allowed the morbid action to make so extensive and fatal progress before sufficient alarm was excited, as to be utterly beyond the reach of treatment. Consequently, it appears to us, that in uterine diagnosis it may be most safely and justly laid down as a

SECOND PROPOSITION.

In almost all instances of diseases of the Uterus, it is only by the Physical Examination of the organ itself that we can distinguish the precise nature of the existing affection, and fix its character, extent, etc.

The information thus obtained may be merely *negative*, but it is not the less useful either in a diagnostic or in a practical point of view. In a case of morbid discharge of blood from the vagina, for example, we may only ascertain that there is no appreciable organic disease of the uterus. Our prognosis and treatment, however, of a case of menorrhagia would, under such circumstances, be very different from those which we should adopt, if, by the same examination, we discovered a state of simple ulceration of the cervix, or congestive enlargement of the uterus, or the presence of a polypus, or the existence of a cauliflower excrescence or carcinomatous degeneration.

Local examination, however, usually affords us much *positive* and direct information with regard to the seat and character of the existing disease, by informing us of all those changes that have taken place in the vagina and uterus, which can be recognised by touch or sight. By it we are thus often enabled to detect the different morbid conditions of the cervix, whether congestive, inflammatory, or more strictly organic. We can generally distinguish, by the same means, these states from each other, and discriminate between the equally enlarged and dark-coloured congestion of the cervix, and the different forms of inflammation to which its structures are liable, whether that inflammation has assumed the granular, ulcerative, aphthous, or pustular type ;—between simple, syphilitic, corroding, and carcinomatous ulcers of this part ;—between granular enlargements, cauliflower excrescence, and cancerous degeneration of the cervix ;—between the vaginal tumours formed by prolapsus, or

by inversion of the uterus, and those formed by the presence of a simply hypertrophied cervix, or of a true polypus;—and between the general diffused enlargement of the organ produced by hypertrophy of its walls, or distension of its cavity, and that irregular, roundish, knobbed form which it almost invariably assumes in cases of fibrous tumours, and in such cases only.

THIRD PROPOSITION.

The Physical Examination, as hitherto practised, seldom enables us to ascertain accurately the organic condition of more than the cervix and lower part of the body of the Uterus.

If the uterus be large, and the woman of a spare and lax habit, we may indeed be able to feel the fundus of the organ through the walls of the abdomen, by the hand pressed in above the pubes. It generally, however, lies so low in the pelvis, and usually moves away so readily under the touch and pressure of the fingers, that, even in such persons, this means of examination is of no great avail. In all persons of an opposite habit, and in most cases where the uterus is misplaced without enlargement, the hypogastric examination is of little or no use whatever.

By examination per vaginam with the finger, we can only, except when the uterus is prolapsed, feel the cervix, and the parts resting on the roof of the vagina. Hence, diseased states of the cervix, having been far more easily ascertained than diseased states of the body and fundus of the organ, have, probably, been very much over-rated, both in frequency and importance, at least since the speculum has come into more general use. In regard to the parts that are felt through the roof of the vagina, the touch alone does not, in many instances, give us information at all sufficiently satisfactory and decisive. We can, no doubt, when the tumour is large, often ascertain with considerable accuracy its size and form, by combining the vaginal examination with the aid derived from examination by the rectum, and above the pubis. But we are still, in many cases, left entirely in the dark as to whether the existing tumour is an enlargement of the whole mass of the uterus, or a distension of its cavity, or a morbid growth; and, if the latter, whether the growth is seated in the uterus itself, or in one of the ovaries or other neighbouring parts. If the tumour is small, and cannot be felt above the brim, we then have it not even in our power to ascertain its size and form, as we can examine it only on one side, namely,

on that next the vagina. Under these circumstances we are unable to tell whether it arises from a new morbid structure attached to the uterine parietes, or from a simple displacement or flexion of the fundus of the uterus itself.

To meet these and other difficulties in uterine diagnosis, I have for some time past been in the habit of using a metallic Uterine Sound or Bougie of nearly the size and shape of a small male catheter, which, when introduced, as it can easily be done, into the interior of the uterus, and manipulated there in different ways, has proved to me of great service in rendering the diagnosis of the diseases in question, and more particularly those of the *fundus*, *body*, and *cavity* of the organ, parts usually considered beyond the reach of examination, much more accurate and precise than can be effected by any other means with which I am acquainted. I am induced to bring this means before the notice of the profession, under the strong hope that the instrument will be found of equal service in the hands of others; and the results which have been obtained by it seem already sufficient to enable us to place, among the generalities of uterine diagnosis, the following as a

FOURTH PROPOSITION.

It is possible, by the use of a Uterine Sound or Bougie introduced into the uterine cavity, to ascertain the exact position and direction of the body and fundus of the organ—to bring these higher parts of the uterus, in most instances, within the reach of tactile examination, and to ascertain various important circumstances regarding the os, cavity, lining membrane, and walls of the viscus.

Having already exhausted my present limits by these preliminary observations, I must reserve the particular description of the instrument—the modes of introducing and using it—and the different diagnostic indications which it is capable of fulfilling, for a second communication.

Section II.[1]

PROPOSALS FOR THE IMPROVEMENT AND ELUCIDATION OF UTERINE DIAGNOSIS, BY MEANS OF A SOUND OR BOUGIE PASSED INTO THE UTERINE CAVITY.

In my former paper I took occasion to speak of the uncertainty of those symptoms of Uterine Disease that consist merely of de-

[1] See *London and Edinburgh Monthly Journal of Medical Science*, August 1843, p. 701.

rangements in the functions of the uterus itself, and of other contiguous and sympathising parts. Some facts were adduced to show, that, in uterine pathology, this uncertainty was so marked, that frequently the same affection of the organ was accompanied in different cases by different trains of functional symptoms; while it held equally true, that occasionally the same train of symptoms was found indiscriminately in connection with a number of morbid conditions of the uterus, that were essentially and practically dissimilar from one another both in their nature and treatment. From this frequent want of relation between morbid states of the uterus and their functional effects—from finding identical lesions combined, in a variety of instances, with very diversified symptoms—and identical symptoms connected with very different lesions—it followed, that in order to form a sure and perfect diagnosis in this class of affections, it is generally requisite to take into consideration the exact structural state of the uterus itself, and hence to institute, for the ascertainment of this point, a careful local examination of the organ. In urging the necessity of such a physical examination of the uterus in uterine diseases, I endeavoured only to claim for that organ a means of diagnosis, which, when practicable, is regarded as indispensable in the case of every other part of the system. In discriminating from each other, for example, the various kinds of morbid affections of the eye, no medical man would trust merely to the knowledge that he might acquire regarding the derangements of vision that might be present, the degree and character of the local and sympathetic pains, the quality and nature of the lachrymal and conjunctival secretions, the accompanying state of the system in general, etc.—he would farther, in order to arrive at such an accurate diagnosis as would enable him to institute a rational course of treatment, examine as thoroughly as possible the local structural condition of the organ itself, as the only means of determining in what individual texture or textures, whether the conjunctiva, cornea, lens, etc., the disease was specially localised, and what the precise nature of the morbid action really was in the texture that was affected. In the same way, in a case of excessive morbid irritation of the urinary passages, no surgeon would venture to decide precisely what the extent, seat, and nature of the affection was—and whether renal, vesical, or urethral—until he had made a strict local or physical examination of the urinary organs themselves. He might, by the kind of functional derangements present, be led to suppose that the morbid irritation was connected with a stone in the bladder, or an

enlargement of the prostate, or a stricture of the urethra, etc.; but he could never be perfectly certain that one or other of these was the cause, until he had instituted, with the finger, sound, etc., a local examination of the parts implicated. It is exactly the same with uterine diseases. The external symptoms may show the presence of disease in the uterine organs, and occasionally may be such as to lead us to adopt some opinion as to its nature; but we can never, in any case of the slightest doubt, be certain of its exact character and extent, to such a degree as to serve for guides to our diagnosis, prognosis, and treatment, unless we have the aid of the knowledge of the local structural state of the viscus itself.

A portion of my former communication was further taken up in showing, that the methods of uterine diagnosis as hitherto practised, whether by touch, or the speculum, or both, were, except where the patient was of a spare and relaxed form, calculated principally or only to distinguish the various morbid states of the cervix uteri. Lastly, I ventured to suggest, as an addition to our other means of uterine diagnosis, that the higher and more interior parts of the uterus should be examined by a Sound or Bougie introduced into the uterine cavity, and stated that various points of great importance, and otherwise unascertainable, could be made out by its assistance.

In the present chapter I intend briefly to state the kind of instrument I have used, and the modes of introducing and manipulating it, with some of the points of information which we can obtain through its employment.

DESCRIPTION OF THE UTERINE SOUND.

I have already stated that the instrument which I employ is somewhat similar to a small male catheter. It is, moreover, provided, like the common male sound, with a flat handle, to facilitate its manipulation; and terminates at its other extremity in a rounded knob or bulb, to prevent injury to the uterine textures. The intervening stem tapers gradually from the handle to the knob, the thickest part being nearly one-fifth of an inch in diameter, equal to the size of a catheter No. 8, and the thinnest part about one-tenth of an inch, or equal to a catheter No. 3. The greater thickness of the attached extremity is necessary to give that portion of the instrument the requisite degree of strength and resistance; it is more slender towards its other extremity, to allow of its easily entering

into, and being moved in, the orifice and canal of the uterus. The terminating bulb is about one-eighth of an inch in diameter. The stem is about nine inches in length, and graduated so as to render its employment, and some of its indications with regard to the measurement of the uterus, more precise. Different modes may be had recourse to in marking it, but the marks, whatever they may be, must be such that they can be easily felt with the finger while the instrument is within the vagina. For this purpose, they must be placed on the convex or posterior surface of the instrument, the surface, namely, with which the directing finger is in contact. The mode of graduation adopted in the instrument I have myself used, and which is figured in the engraving, is as follows :—At two inches and a half from the extremity of the instrument, this measurement being the usual length of the uterine cavity, there is placed a slight elevation or knob, which, in the employment of the Bougie, at once serves to show that it is introduced to the full extent into the

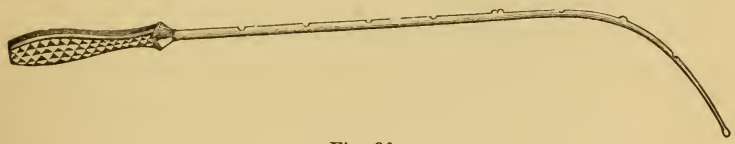

Fig. 20.

interior of the organ, and at the same time forms a fixed or standard point from which the instrument may be farther graduated towards either of its two extremities. This farther graduation is marked by shallow grooves, which may be placed at the distance of either half-an-inch or an inch from each other, and, by their assistance, it becomes an easy matter to measure the exact length of the uterine cavity, when either it is diminished, or, as much more frequently happens, when it is prolonged to different degrees beyond its usual dimensions. The alternate groove may be double, to facilitate the measurement by the finger. The form of curvature at the extremity of the instrument is nearly that of a common catheter, and, like it, begins about three or four inches from its point; but the degree and extent of this curvature require to be varied according to the necessities of individual cases, and according to the indications which it is wished to bring out. Hence the stem of the Bougie requires to be formed of a metal that admits of being pretty freely and frequently bent without the risk of fracture, and at the same time is capable of adequately maintaining any form that may be temporarily given to it. These objects are fully attained when the stem is made of solid silver, but probably some composition

of the inferior metals may also be found to have the necessary combination of pliability and strength. The handle of the Bougie is made of wood or ivory, is about three inches long, three-fourths of an inch at its broadest part, and rather more than a quarter of an inch in thickness. The posterior surface of it is smooth, whilst its anterior surface, or that corresponding to the concave aspect of the Bougie, is roughened, in order to make the operator constantly aware of the direction of the point of the instrument when it is hid in the uterine cavity—a circumstance which we shall afterwards see to be of great importance in reference to some of its diagnostic uses.

Mode of Introduction.—In introducing the Bougie or Sound into the uterine cavity, the patient may be placed either on her back or left side. If on her back, the fore-finger of the right hand is introduced into the vagina, and its extremity brought in contact with the indentation formed in the cervix uteri by the os tincæ, so as to act as a guide to the point of the instrument. The instrument itself is held in the left hand, and its point slipped along the palmar surface of the finger in the vagina, and directed by it into the uterine orifice. If the patient is placed on her side, she must lie with her body directly across the bed—a position which facilitates greatly the manipulations required both for common tactile examination, and for examination by the Sound and Speculum. In this case the fore-finger of the left hand is used as a guide to the os uteri, and the instrument is held in and directed by the right. In some instances where the parts are very lax, and the cervix uteri in any way displaced, the introduction of the Bougie is facilitated by passing both the fore and middle fingers into the vagina, fixing the cervix with them in the axis of the passages, and gliding the instrument along the groove between the two up to the os. In whichever of these ways the Sound is guided up to and passed within the os uteri, it generally afterwards glides easily, under a slight propulsive force, along the canal of the cervix and body, till, as shown by the elevated mark already alluded to as placed on the stem, its extremity has passed onward to the fundus of the organ. Sometimes the extremity of the instrument is slightly obstructed about an inch or less within the os tincæ, by the natural contraction existing there between the cavity of the cervix and cavity of the body. This obstacle is easily overcome by a little additional impulse, or, if that fail, by slightly retracting and altering the direction of the point of the Sound. The direction which the instrument should naturally follow in passing along the uterine

canal, must always be held in view. In the normal condition of the parts, the uterus and vagina meet at a considerable angle, the former passing upwards and at the same time considerably forwards, and varying somewhat its inclination with the varying degrees of distension of the bladder and rectum. In using the Bougie, therefore, supposing the organ to be in the natural position, its concavity should be directed forwards towards the walls of the abdomen ; or, in other words, it should be passed in the same direction as in most other manipulations in this part of the body, namely, in the line of the axis of the brim of the pelvis.

The degree of uneasiness felt by the patient during the passage of the instrument is in general very trifling, and not more, if so much, as is felt on passing the catheter along the urethra of the female, and certainly not by any means nearly so great as in using the Sound or Bougie in the male. In a few cases, I have seen it, like the passing of the sound in the male, produce a feeling of sickness and nausea. In the healthy state, however, of the organ, the lining membrane of the uterus does not in fact appear to be more sensitive than that of the vagina, so that the existence of any true and actual pain in making the examination with the Bougie is to be considered so far anormal, that it is generally, as we shall afterwards see, indicative of the existence of some morbid state or other of the part or parts with which the extremity of the instrument is at the time in contact.

In the average run of cases, the introduction of the Sound into the uterine cavity is probably not more difficult to accomplish than the introduction of the catheter into the bladder of the female. The os uteri is, in fact, usually much more easily and certainly detected by the finger, than the orifice of the urethra ; and generally the one and the other instrument passes readily along its appropriate canal after it has once entered it. If it is otherwise, the very difficulty may be in itself important, as marking the existence of some anormal and probably diseased state. It is almost unnecessary to add, that the power of passing either instrument with perfect facility and certainty, is only to be gained by a little perseverance in the practical employment of them.

The manner in which the instrument should be manipulated, after it is fully introduced into the uterine cavity, varies according to the object or objects which we wish to ascertain. The mode of using it with these views will be best explained by now pointing out individually, and at some length, the different diagnostic indications which it is capable of fulfilling.

USES OF THE UTERINE SOUND.

I. *The Sound increases to a great degree our power of making a perfect and precise tactile examination of the Fundus, Body, and Cervix of the Uterus.*

I have already stated, that the body and fundus of the uterus are so deeply included in the cavity of the pelvis, and at the same time are generally so mobile under the pressure of the fingers, whether applied to the organ from above or below, that it is difficult to ascertain anything precise with regard to the condition of these parts, either by a common vaginal, or by a hypogastric examination.

The obstacles which thus so effectually oppose an accurate and complete tactile investigation of the surfaces and walls of the body and fundus of the uterus, may be, in most cases, in a great measure, overcome by the aid of the Uterine Sound, if we employ it for the double purpose—first, Of giving sufficient *resistance* to the organ for its exploration by the fingers; and, secondly, Of altering the *position* of its parts, so as to bring them each successively within the reach of tactile examination.

When the pliable and mobile uterus is held steady by the sound being placed in its cavity, and the central axis of the organ is for the time being thus rendered, as it were, *firm* and *solid*—the examination of its external surface and of its walls becomes a matter of far more certainty and accuracy than if we had the organ indefinitely yielding and receding before each slight touch of the fingers.

But besides thus rendering the organ fixed and resistant for our examination, the Uterine Sound will, as a diagnostic means, be found of still greater use and importance, by the control which its presence in the uterine cavity gives us over the *position* of the whole organ, and by its enabling us to alter at will the situation of the viscus to such a degree, that we can in succession bring within the range of a tactile investigation different parts of its external surface and parietes, that are generally considered to be entirely beyond our reach. In reference to this remark, it must be specially kept in mind that in the healthy state the uterus is so loosely fixed in its situation in the pelvic cavity, that its position is capable of being changed to a very considerable extent, without incommodity or injury, by such exterior influences as may naturally or accidentally act upon it. Its position is so far constantly changed by the varying states of distension of the bladder and rectum. Under voluntary efforts of straining, it can in

general be readily pushed down half-an-inch or an inch in the cavity of the vagina. It may be drawn down by instruments till the cervix reaches the external parts themselves, or even protrudes beyond them—a circumstance which facilitates immensely the operation of excision of this part of the organ. In consequence of the same anatomical peculiarity, we are able, through the use of the Uterine Bougie, to move the organ upwards, forwards, etc., to such degrees as are requisite for a complete hypogastric examination, without in general causing any marked inconvenience or pain to the patient.[1]

If, after the Bougie is introduced into the uterine cavity, we carry the handle backwards towards the perineum, the upper extremity of the instrument—and consequently the fundus uteri placed upon that extremity—will be proportionally moved forwards into the hypogastric region. One hand placed above the pubes will now feel the fundus uteri, with the central and thinnest part only of the abdominal parietes intervening between the fingers and the surface of the uterus. Provided the woman be not of a full habit, and the abdominal muscles sufficiently relaxed by position, we can now pretty accurately examine, with the hand placed on the hypogastric region, the state of the uterus as it is held forwards on the end of the Bougie, and we may always make ourselves still more certain of its condition by retracting and otherwise moving

[1] In corroboration of the statements in the text with regard to the natural *mobility* of the uterus, I would beg to fortify the remarks I have there made, by quoting upon the subject the opinions of two of the latest authors who have adverted to this particular point—Cruveilhier and Lisfranc. When speaking of the uterus in his excellent *System of Descriptive Anatomy*, Cruveilhier observes, "The looseness and extensibility of its connections enable it to float, as it were, in the cavity of the pelvis, and to be moved to a greater or less extent. The facility with which it can be drawn towards the vulva in certain surgical operations, and its displacement during pregnancy, when it rises into the abdomen, are proofs of its great mobility."—Vol. i. p. 618, of Dr. Madden's translation. Lisfranc's observations are still stronger. "There is," he remarks, "a physiological fact of importance but little known, and which hitherto has scarcely been alluded to by any writer. The uterus in the normal condition, and even when affected with engorgement, has a truly extraordinary mobility. To prove this, a very simple experiment will suffice. Let a speculum be introduced as high up the vagina as possible, so as to embrace the cervix uteri within its upper extremity; then bid the patient bear down as if at stool; and you will perceive that as the instrument descends, the uterus follows it to the extent of one, or even of two inches; an immense advantage when the surgeon wishes to bring down the uterus to near the vulva. In cases requiring operation about the cervix, all that the surgeon has to do is, to lay hold of the os uteri with a hook, and draw it gently down, until it comes fairly within sight; this may be effected without difficulty, and with very little inconvenience to the patient."—Translated from the second volume of the *Clinique de la Pitié*, into the *Medico-Chirurgical Review* for April 1843, p. 360.

the handle of the instrument so as to bring the different parts of the superior and anterior surfaces of the uterine tumour under the touch of the fingers. By a slight turn of the instrument to either side, the lateral surfaces of the upper part of the viscus may, in the same way, be brought under our tactile examination; and in spare subjects, I have occasionally found it possible, when the fundus was pushed against the abdominal parietes, to extend the manual examination to some distance along the posterior wall of the organ.

In those cases where this cannot be effected, the sound still enables us to make a more perfect tactile examination of this—the posterior, part of the uterus, than we could otherwise effect, by giving us the power of temporarily depressing and reflecting its posterior wall, so that it may be felt by a rectal examination. The vaginal examination of the lower part of its anterior surface may be in general rendered more complete by a similar aid from the instrument.

In these different steps of examination, the degree and accuracy of the information obtained is varied in different individuals by the differences which exist in the thickness of the tissues placed between the uterine surface and the fingers; but in most instances the presence of any marked irregularity in the uterine structures—such as the presence of one or more small fibrous tumours—their hypertrophic thickness, etc., may be readily made out—and, under still more favourable circumstances, the exact physical conditions of the organ, in relation to its volume and dimensions, the morbid tenderness of individual parts of it, etc., may be precisely determined.

When we employ the sound for the purposes alluded to in the preceding sentences—namely, for enabling us to make hypogastric examinations of the fundus and body of the uterus—the instrument, before its introduction, should have its extremity bent upon its stem at as nearly a right angle as the conformation of the genital canals admits, and, after being introduced, its handle should be well retracted towards the perineum. By attending to these circumstances, the fundus and body of the uterus will be more easily and fully turned forwards, and our examination of them very much facilitated. The same object will also be much promoted by retaining the directing finger at the cervix during the course of the examination, both to steady the instrument and to serve as a fulcrum to it. In that case the handle may be retracted or pushed backwards to any required degree by the forearm, while the other hand is employed in the hypogastric examination.

The preceding remarks apply to the examination of the fundus and body of the uterus, parts which—unless when much enlarged, or the patient very thin—are generally looked upon as beyond reach of any physical diagnosis.

The physical states and relations of the cervix uteri are generally ascertainable by the finger alone. Still, in various morbid conditions of the cervix, our tactile examination of the organ may be much promoted by the assistance of the bougie introduced into the uterine cavity. For instance, in chronic enlargement, cauliflower excrescence, and other organic diseases of that part, it is sometimes a matter of moment, both as regards our prognosis and our treatment, to ascertain if the existing diseased state stretches upwards so far as to involve or not the lower portion of the body of the uterus. In several such cases, I have found much assistance in determining this point by gently depressing the uterus by the bougie introduced into it, and having the power thus of examining the organ, immediately above the cervix, by compressing the structures of that part between a finger or two in the vagina, and the resistant sound placed in the uterine cavity, and consequently in the very axis of the viscus. In this way, each point in the circumference of this portion of the organ may be successively examined.

These observations apply generally to such indications as can be made out through the use of the bougie, when the uterus still retains that freedom of motion which we have seen it to possess, when it is itself in a healthy condition, and when there are no obstructions or impediments to its mobility in the surrounding parts. But there are cases where, from the organ having become more or less fixed and immobile, no advantage can be taken of those facilities which the power of partially displacing it in general allows us. In these instances, the very circumstance, however, of the mobility of the organ being lost, and still more the degree and extent of its immobility, often materially assists in pointing out the true nature of the affection that is present. Thus in scirrhus of the cervix, the early immobility of that part, in consequence of the morbid degeneration invading the contiguous tissues from almost the very commencement of the disease, is often one of the first and best characteristics of that dreaded malady. In this instance, the fixed state of the cervix of the organ is detected by the direct application of the finger. In other states of disease, the cervix remaining comparatively free and unaffected, the body and fundus may be immobile from various pathological causes, as from morbid

adhesions, the consequence of inflammation of its peritoneal surface, from the pressure of tumours or abscesses, etc. Or, again, both cervix and fundus may be immobile at the same time, from general carcinoma of the organ, etc. In all these cases the immobility of the body and fundus, its degree, extent, and seat, can only be discovered by the bougie; and its use, along with other considerations, may further lead us to detect the special pathological state that may be the cause of the morbid attachment or fixture of these parts of the organ.

II. *The previous introduction of the Sound facilitates and simplifies the subsequent Visual examination of the Cervix Uteri with the Speculum.*

In employing the speculum uteri, the principal obstacle which we have to contend with is the impossibility of always catching easily and accurately the os and cervix uteri in the upper or internal extremity of the instrument, so that these parts may be brought at once and completely within the range of sight. Indeed the search after the cervix uteri, when it is not at first caught in the open end of the speculum, is sometimes so painful to the patient, and this part of the manipulation is occasionally so difficult to the operator, that every one who has made much use of the speculum will, I believe, be ready to confess that in some cases where the uterus is situated obliquely, or where the cervix is high and displaced, the object is almost impossible of attainment.[1] The previous introduction and use of the uterine sound offers a simple and certain means, both of overcoming the difficulty in question, and of facilitating the employment of the speculum in our ordinary cases of examination with that instrument. After making such tactile examination as may be required with the sound, leave it in the uterine cavity, and using it as a general guide, slip the uterine extremity of the speculum, whether tubular or bladed, over its handle and along its stem, till the instrument be fully introduced. The upper or uterine extremity of the speculum is thus guided with almost unerring certainty along the stem of the sound, till the cervix uteri is touched

[1] Thus, in their excellent Treatise on Diseases of the Uterus, Boivin and Dugès state that "The cervix uteri is sometimes so inclined backward that the speculum *cannot* show it by any movement."—Heming's Translation, p. 33. See also Lisfranc's Lectures as reported by Pauly, *Maladies de l'Utérus d'après les Leçons Cliniques de M. Lisfranc*—Paris, 1836, pp. 59, 60; and Téallier, *Du Cancer de la Matrice*, pp. 70, 71, etc.

and included in its opening. Further, if we still keep the sound in the uterus, we have in it a means of turning the cervix to one or other side at will, so as to give ourselves a complete view of the mucous membrane covering the whole vaginal surface of this part of the organ. This last step in the examination is much facilitated by first drawing aside the stem of the bougie into the cleft between the two blades of the speculum—provided we are using a double-bladed instrument.

In making these remarks, I presuppose that the patient, during the employment of the sound and speculum, is placed upon the left side in bed, in the position already pointed out as most favourable for making a common tactile examination. When occupying this position, with, as previously recommended, the body laid across the bed, the speculum can be employed with perfect ease and success, and, at the same time, without any of that revolting exposure of the person of the patient, which is unavoidable when she is turned, as is so commonly practised, upon her back during this operation. The instrument can be introduced readily without the assistance of sight, and if the bed and body clothes be placed with a little care in contact with the surface of the patient, and the latter be closely arranged around the tube of the instrument, the mouth of the speculum is the only part which actually requires to be uncovered in order to enable us to examine the cervix uteri and canal of the vagina, and there ascertain those changes of colour, superficial alterations of structure, etc., that the speculum is occasionally of so great service in divulging, and by which we may have an opportunity, in doubtful instances, of either confirming or correcting the previous evidence afforded by the sense of touch.

III. *By the use of the Uterine Sound we may, in many instances of Pelvic and Hypogastric or Abdominal Tumours, ascertain the connection or non-connection of these Tumours with the Uterus.*

We have already seen the advantages of having the uterus fixed upon the bougie in facilitating the tactile examination of the outer surface of the organ. This use of the sound is of still greater importance, when a chronic pelvic or hypogastric tumour is present, and we wish to ascertain whether this additional structure has its origin in, or any connection with, the tissues of the uterus, or is attached to some of the neighbouring parts or organs. The power of making such a distinction leads, in some instances, to practical

distinctions in the treatment, and in almost all cases to differences with regard to our opinion of the future progress of the disease. The prognosis, for example, is very different in ovarian dropsy, and in enlargement of the uterus from the presence of a large mass of fibrous tumours in its walls. I have found, however, no mistake to be more common in practice, than to suppose a tumour in the hypogastric or iliac region to be an enlarged and dropsical ovary, when it actually consisted of the other much less formidable disease of a great mass of fibrous tumours in the uterine structures. When these fibrous tumours "attain," to quote the words of Dr. Lee, "a large size, and come to occupy a great part of the abdominal cavity, they produce all the injurious consequences of enlarged ovaria, from which indeed, during life, they are distinguished with the greatest difficulty."[1] "It is often," says Dr. Ashwell, "exceedingly difficult, where a growth, occupying the abdominal cavity, is large, filling perhaps its greater portion, to determine whether the uterus or ovary, or both, may not be diseased."[2] This difficulty is, in some cases, more or less removed by the evidence afforded by the use of the uterine sound.

When the tumour which is present is uterine, and consists of either some general or partial enlargement of that organ, I have usually been able to gain satisfactory evidence of the fact by the bougie, when passed into the uterine cavity, entering, as it were, more or less directly into the very structure of the morbid mass, and by the tumour and instrument afterwards reciprocally moving in exact correspondence with all the possible motions imparted respectively to each of them.

In other instances, where the tumour is *not* uterine, I have repeatedly made myself and others certain of the fact, by first introducing the bougie, and so far giving us at once a knowledge of the exact position of the uterus, and a control over its movements, and then proceeding in one of three ways:—1. The uterus may be retained in its situation with the bougie, and then, by the assistance of the hand above the pubis, or by some fingers in the vagina, the tumour, if unattached to the uterine tissues, may be moved away from the fixed uterus. 2. The tumour being left in its situation, it may be possible to move away the uterus from it to such a degree as to show them to be unconnected. Or, 3. Instead of keeping the uterus fixed and moving the tumour—or

[1] *Cyclopædia of Medicine*, vol. iv. p. 388.

[2] *Practical Treatise on the Diseases peculiar to Women*, Part ii. p. 291.

fixing the tumour and moving the uterus—both may be moved simultaneously, the uterus by the bougie, and the tumour by the hand or fingers, to opposite sides of the pelvis, to such an extent as to give still more conclusive evidence of the same fact. In a case, for example, which I saw during the last winter, there were two distinct, firm, defined tumours to be felt at the brim of the pelvis when the hand was placed above the pubes. The smaller of these tumours was placed to the left, and somewhat anterior to the other. The two tumours lay so close as to seem to be connected with each other, and this, with their semiglobular form, impressed the physician who had charge of the case with the belief that his patient had one of those masses of roundish fibrous growths affixed to the uterine walls that I have already spoken of as not unfrequently met with in this part of the body. The hypogastric examination of the swelling induced me at first to adopt the same opinion, but the employment of the bougie readily showed us to be both in error. The instrument, when introduced through the os into the uterine cavity, passed directly upwards to the top of that tumour which lay towards the left side, and the apex of the sound could be felt through the intervening tissues, at once demonstrating that this apparent tumour was formed by the fundus of the somewhat enlarged and displaced uterus. Retaining the instrument in this position, the uterus was next moved by means of the bougie still farther to the left, whilst the other tumour was at the same time pushed still farther to the right or opposite side, by the pressure of the hand, with such ease and to such an extent as to prove that it had no immediate organic connection with the uterus. The farther examination of the tumour on the right side—its rounded form and other physical characters—its position behind the broad ligament, etc.—showed it to be ovarian. Without, however, the aid of the bougie, the two hypogastric swellings in this case would assuredly have passed for uterine fibrous tumours, instead of the one being formed by the fundus of the uterus, and the other by an enlarged ovary.

The rules of diagnosis which I have been stating, evidently apply only to those cases in which the uterus and pelvic or hypogastric tumour are neither organically adherent to each other, nor so closely wedged together as to render them mutually immovable. But it often happens that, in consequence of the existence of one or more of these last-mentioned conditions, none of the tests that I have just now spoken of can be applied, and in

such instances the bougie affords no very affirmative evidence. Still, however, the knowledge which we can gain by it, and by it alone, of the state of the uterine cavity, of the increased or diminished length of that cavity, and especially of its relative *situation* and direction in regard to the existing morbid mass, are calculated in some of these more difficult and complicated instances to afford no small degree of assistance in the diagnosis.

In one common set of cases, the knowledge of the exact situation of the uterine cavity, and hence of the uterus itself, in relation to the tumour that is present, even when both were immobile, has in repeated instances appeared to me especially important. The ovary normally lies behind the uterus, being attached to the *posterior* surface of the broad ligament. If, therefore, in a case of chronic tumour situated in the pelvis, the sound shows the tumour to lie on the *anterior* surface of the uterus; or, in other words, if the uterine cavity runs up the posterior surface of the morbid mass, the disease may be considered as certainly not ovarian, and the further difficulties of the diagnosis will thus be so far very much simplified by way of exclusion. This remark particularly applies to those cases in which the tumour, of whatever nature it may be, is still not so large as to have passed out of the pelvic cavity and become abdominal.

I have found, however, advantage from the negative information given in other ways by the bougie, even when the tumour was abdominal in its seat. An example will best illustrate my meaning. In a case sent to Edinburgh a few months ago, for the purpose of having some opinion given in regard to its nature, an immense abdominal swelling that was present, and which had been supposed by some medical gentlemen who had seen the patient to be ovarian, was shown not to be so, by sufficient evidence of the following nature. The uterus was displaced obliquely backwards, and the fundus of the bladder was displaced towards the right iliac region by the abdominal enlargement—circumstances which were easily ascertained by introducing the uterine sound into the cavities of both of these organs. Further, the uterus, though displaced, was quite mobile; and when its fundus was turned by the bougie towards the site of either ovary, and the abdominal tumour lifted at the same time as high as possible towards the epigastrium, no obstruction was met with, nor was this great change upwards in the direction of the tumour found to produce *any dragging effects whatever* upon the uterus as held by the bougie, or upon its

connections—effects which, unless under the improbable supposition of a pedicle several inches long, would have inevitably occurred if the diseased mass had originated in or was connected with the ovaries or uterine appendages. So far, the evidence was negative, but still, nevertheless, important. I may add, that other characters of a more positive nature—the history, particular form, and consistence of the tumour—its position in front of the intestines as ascertained by percussion, etc. etc.—seemed to show it, seeing that it was not ovarian, to be in all probability one of those hydatigenous tumours that sometimes form in the tissue of the omentum, and whose physical symptoms during life in many respects correspond with those of ovarian dropsy.

In a case, in which a very large hard and solid tumour was situated in the mesial line of the abdomen, and had been growing for years, the aid of the uterine bougie assisted us greatly in making a diagnosis of its pathological seat and character, by a kind of evidence which was exactly the reverse of that stated in the preceding instance. In the case we speak of, the os uteri was in its usual situation in the pelvis; the bougie, however, after passing through it, glided onwards, obliquely forwards, and towards the left, showing the body of the uterus to be displaced in that direction, Farther, it was ascertained, by moving the bougie in the uterine cavity, that the progress of the uterus towards the right side was entirely prevented by the presence of the opposing morbid mass, whilst it could be moved to the left side to a slight extent, but still so much so as to show that its surface was not *immediately* adherent to the tumour. Holding the bougie in the uterus, with a finger in contact with the cervix uteri, the body of the growth was next strongly pushed both upwards and to the right, with the other hand placed upon the lower part of the abdomen. When so moved, the tumour distinctly pulled upwards along with it the uterine bougie, and consequently the uterus itself. The whole examination by the bougie thus showed:—that, *first*, The tumour was not a fibrous growth developed in the uterine structure, or intimately attached to its exterior surface, because the body of the uterus, though displaced by the presence of the growth, was still movable to a certain degree independently of it; *secondly*, It was probably an enlarged ovary, or tumour connected with the ovary or uterine appendages, because, when moved upwards or to the right, it dragged the uterus along with it; *thirdly*, Though mesial in its position, it was attached to the side of the right ovary, or to the posterior sur-

ace of the right broad ligament, because the body and fundus of the uterus were displaced forwards and towards the left, and had some remaining mobility in that direction, but could not be moved by the bougie in any degree backwards or towards the right side, in consequence of the presence of the opposing mass of the tumour. These circumstances in the physical diagnosis of the tumour, as ascertained by the bougie, were confirmed by the other symptoms of the case; but these other symptoms would certainly, in consequence of the equivocal character and position of the tumour, have been in themselves insufficient to have fixed its true pathological seat and character.

In the preceding remarks, I have pointed out the uses of the uterine bougie, in so far as they aid our examination of the *exterior* of the uterus, or of the outer surface of the Fundus, Body, and Cervix, and enable us to distinguish between tumours of the uterus itself, and those situated in structures altogether external to it.

In continuing the subject in my next communication, I shall attempt to state the still more important uses to which the instrument can be put, in examining the *interior* of the organ, and the state of its walls, and in determining the presence of those common but hitherto little known forms of displacement that pass under the names of retroflexion, anteflexion, etc. I shall take the same opportunity of showing the circumstances which counter-indicate the use of the sound, and the cautions required in its employment.

Section III.[1]

On the Measurement of the Cavity of the Uterus as a Means of Diagnosis in some of the Morbid States of that Organ.

No organ of the body is, in its normal and physiological state, more subject than the uterus to great and striking alterations of volume. Witness its rapid increase during pregnancy, and its still more rapid diminution in the puerperal female. In some of its anormal and pathological conditions, the same organ strongly displays the same tendency to enlarge in different directions and dimensions. "No tissue," observes Cruveilhier, "is more extensible, more malleable (*plus extensible, plus malléable*), than the tissue of the

[1] See *London and Edinburgh Monthly Journal of Medical Science*, November 1843, p. 1009.

uterus, when it has undergone the softening which constantly accompanies its hypertrophy. It becomes elongated and extended in all directions; and it is only when its distension is carried beyond measure, that upon its hypertrophy supervenes atrophy."[1] Again, on the other hand, the cavity of the unimpregnated uterus is so small, and its canal of communication with the vagina is so narrow, that they are liable to be found more or less obliterated by malconformation or disease; while the uterine walls themselves are sometimes observed, by their partial displacement and inversion, to shorten, and even to efface, the internal cavity of the viscus.

The changes in the capacity and dimensions of the uterus, which are thus so often produced by disease, have been long well known to the pathological anatomist. They have hitherto, however, in a great measure, escaped the observation of the medical practitioner, because, though frequently discovered by him upon the dead body, he possessed no certain means of detecting their presence during the lifetime of his patient. In the following communication, it is my purpose to show, that this blank in uterine pathology may be filled up, and that we can ascertain, by means of the bougie, with sufficient facility and precision, upon the living subject, the varying sizes of the uterine cavity. And here, as in all other cases in which physical signs have enabled us to determine pathological lesions during life, we shall find that the knowledge of them may be rendered of the highest avail in diagnosis and practice.

With these views, we shall attempt to illustrate as our next proposition, with regard to the uses of the instrument which we are describing, that

IV. *The Uterine Bougie is capable of affording valuable diagnostic information, by enabling us to measure the Length of the Uterine Cavity.*

The uterus varies in its dimensions, and consequently in its length, in different persons, independently both of pregnancy and disease. In the unimpregnated state, and in its normal and healthy condition, I have found the cavity of the organ to measure, on an average of a pretty extensive number of observations made both upon the living and dead body, about two inches and a half from the os to the fundus. The bougie has, as already stated, an elevated mark upon its stem at this distance, two inches and a half, from its

[1] *Anatomie Pathologique*, livr. xiii.

point, for the purpose of showing whether or not the instrument is completely introduced into the uterine cavity. The cavity is, in its normal varieties, more often above than below the standard. Further, the instrument, as previously mentioned in the description that has been given of it, is so graduated by inch or half-inch marks upon its stem, as to indicate, when it is introduced up to the fundus uteri, the exact degree of elongation, or of shortening of the interior of the organ. In illustrating its utility in this respect, I propose to demonstrate its application to the discovery, *first*, Of some morbid states in which the uterine cavity is preternaturally increased ; and, *secondly*, Of others in which it is preternaturally diminished in length. In the present communication, we shall limit our attention to the first of these divisions, or to

INSTANCES OF INCREASED LENGTH OF THE UTERINE CAVITY.

The cavity of the uterus may be found elongated under a variety of circumstances which we shall consider somewhat in detail.

1. *Morbid Permanence of the State of Puerperal Hypertrophy.*—This peculiar condition does not appear to have as yet attracted the attention of obstetric pathologists, as the cause of one of those forms of chronic hypogastric tumours that are occasionally met with during the first weeks and months after delivery. The want of any decisive means of recognising it has doubtlessly led to this omission. The notes of a case will show, better than any comment, the nature of the affection to which we allude, and the facility and certainty with which it may be recognised by means of the uterine bougie.

During the summer of 1842 I attended, along with Dr. Abercrombie, a lady, who, after a premature confinement in the country, had suffered from a smart attack of puerperal fever. After so far recovering for a few weeks she was sent from a considerable distance into town, to be treated for what appeared to be a large tumour, stretching upwards from the pelvis into the right iliac region. The tumour had not been observed before delivery, and was somewhat painful to the touch. It seemed at first sight extremely doubtful whether the mass consisted of an inflamed uterine fibrous tumour, or enlarged ovary, or of one of those chronic purulent collections which are apt to form towards one or other iliac region in connection with puerperal fever or inflammation. The sound, when introduced into the os uteri, passed easily and directly upwards for several inches to the superior end of the tumour, and its apex could be

felt there by the hand placed externally. This at once showed the supposed diseased mass to consist of the enlarged uterus. Further examination proved that there was nothing strictly anormal about the uterus except its great size. In fact it was a case where the organ had apparently remained nearly undiminished after delivery, probably from the puerperal attack arresting the usual progress of its absorption and diminution. It decreased rapidly and fully under leeches and other local antiphlogistic treatment.[1]

May not some of the instances of pelvic or hypogastric swellings after delivery, which have been recorded by Puzos and others[2] as lacteal collections (*dépôts laiteux*) or inflammatory effusions, and that ultimately yielded without suppuration, be of the above nature? The lateral position of the swelling is, as shown by the preceding case, not a sufficient criterion.

In one of those cases of subacute inflammatory tumours that occasionally form in the pelvis of the puerperal female, and that lately came under our care, the information afforded by the sound was perfectly the reverse of that obtained in the preceding instance, and yet still of considerable importance. I did not see the patient till nearly two months after her confinement. She had not regained much strength, and there were symptoms present which indicated a degree of subacute inflammation in the region of the uterus. A rounded and circumscribed tumour could be readily felt rising from the pelvis to the height of an inch or two above the brim of the pelvis. Was this a swelling resulting from some limited inflammatory effusion among the pelvic viscera? was it the uterus itself, or some neighbouring organ, enlarged and diseased? or what was its nature? On passing the bougie through the os uteri, which was

[1] Long after the above case and the observations preceding it were written, I met with the following passage in Dr. Hooper's work, showing that the diseased state that I had recognised during life was known to him as a post-mortem appearance:—"When a fœtus has been recently expelled, it is, in some instances, a long time before the uterus returns to its original state; and it is larger and softer during the period. I have examined uteri four times their natural size from this cause, two months, and even more, after the fœtus was expelled."—*Morbid Anatomy of the Human Uterus*, p. 5. Is this the disease alluded to in Kleinert's *Repertorium*, bd. ii. 1838, s. 51, as described by Kopp under the name of Hysteranesis in the first volume of his *Denkwürdigkeiten*, p. 235? I regret that I have no access to this work.

[2] See Levret's *Art des Accouchemens*, p. 168. Des Engorgemens Laiteux dans le Bassin, etc. Deleurye's *Traité des Accouchemens*, p. 509. Des dépôts laiteux dans les ligamens larges, etc. etc. In a MS. copy of William Hunter's Lectures, belonging to the College of Physicians, Edinburgh, among the remarks on puerperal diseases, is a short chapter on "the iliac abscess."

a matter of some difficulty, in consequence of its distance from the vulva, it slipped easily upwards to the top of the hypogastric swelling, and showed the apparent tumour to be the uterus itself, situated much higher, and more anteriorly than usual. It showed further that the uterine cavity was of its usual length, and consequently that, though displaced, the organ was *not* enlarged. It was, however, found to be firmly fixed in its anormal position by some morbid cause, which prevented its fundus and body from being moved by the bougie either backwards or laterally. On searching further into the nature of the morbid cause which could thus anormally displace and fix the organ, I found a large swelling situated at the upper part of the vagina, and between the uterus and rectum. It pressed downwards upon the roof of the vagina, and backwards upon the rectum, and pushed upwards the uterus in front. Its extent and situation in the pelvis were made out by a combined rectal and vaginal examination. Its nature was more obscure, and the feeling of fluctuation, if any, was very indistinct. In the presence of Mr. Ziegler, Dr. Keith, and Dr. Murray, a very slender exploring needle was passed from the rectum through the dense walls of the tumour, in order to ascertain whether it contained fluid, and if so, the nature of that fluid. A drop or two of thin pus escaped along the tube of the instrument. This at once satisfied us of the nature of the tumour. I immediately made a larger perforation into it from the bowel with Pouteau's trocar. A quantity of pus escaped, and continued to do so for a considerable time. The local and general symptoms under which the patient was suffering speedily abated, and she has since entirely recovered her general health and strength. The catamenia have returned. The uterus, however, still remains preternaturally fixed and immobile.

In the case which I have just detailed, the results were to me the more gratifying, inasmuch as some months previously I had seen, in the Lying-in Hospital, an instance of the same disease, in which the affection proved fatal, from the collection of matter bursting into the general cavity of the peritoneum. On the post-mortem inspection of the body, it was evident that from the thinness of the partition intervening between the purulent collection and the cavity of the rectum, the abscess would have soon burst into the bowel, if it had not given way superiorly into the peritoneum itself; and it was equally evident that an artificial opening, made from the rectum into the purulent sac before the period of its rupture, might have saved the life of the patient.

M. Martin of Montpellier, who has written one of the best memoirs extant upon this subject,[1] under the title of *Des dépôts des annexes de la Matrice qui surviennent a la suite des Couches*, recommends, in the treatment of the purulent collection, that, in order both to open it externally, and to produce previous adhesions of the containing sac to the abdominal parietes, caustic potass should be applied to that part of the hypogastrium which forms the most prominent point (*le point le plus saillant*) of the swelling.[2] This rule of practice, which seems to have been very successful in M. Martin's own hands, would, if universally followed out as a mode of evacuating the collection, sometimes lead to an irreparable and fatal blunder. In the case that I have detailed, the most prominent hypogastric point of the swelling was, as we have seen, formed by the uterus itself, as demonstrated by the bougie. The use of the instrument would easily guard against such a mistake as applying—as might have happened in such an instance—the caustic or knife over the uterus, instead of over the purulent cyst itself.

In these cases of subacute or chronic purulent collection in the pelvis after delivery, the pus seems to be in the first instance effused beneath the peritoneum of the uterine appendages, and between it and the pelvic fascia. The original inflammation appears to be seated in the structures intervening between these two membranes. I have seen several cases in the female of chronic "pelvic inflammatory tumours" of the same seat and nature, unconnected with the puerperal state, and where the fixed state of the body of the uterus, the surrounding tumefaction, and the apparent, almost ebony induration produced in the roof of the vagina at one stage of the disease, by the tenseness and distension of the pelvic fascia, gave rise to the idea that the affection was organic and carcinomatous, and not simply inflammatory. I may revert to this subject in a future part. Already the present digression on it is much too long.

[1] See also among the more recent descriptions of the disease, the observations of Dance and Husson in Breschet's *Répertoire d'Anatomie*, tom. iv. p. 172 (8vo edit.); Meniere in *Archives Génér. de Médecine*, tom. xvii. p. 529. Grisolle in *ib.*, tom. xlix. p. 37; Kyll in Rust's *Magazin für die ges. Heilkunde*, bd. xli. s. 311; Imbert in his *Traité des Maladies des Femmes*, tom. i. p. 160; Dupuytren in his *Leçons Orales*, tom. iii. p. 347; Meissner in Kleinert's *Repertorium*, bd. vi. 1842, s. 38; Charlton in the *Edinburgh Monthly Journal* for 1841, p. 329; Doherty in the *Dublin Journal* for 1842, p. 199. I observe that in the last or September number of the *Dublin Journal*, my friend Dr. Churchill has published an excellent memoir on this affection, but does not seem to be aware that the disease has already attracted the attention of many modern writers.

[2] *Mémoires de Médecine et de Chirurgie Pratique*, p. 312.

2. *Normal Elongation of the Puerperal Uterus as a Sign of Delivery.* —Immediately after delivery, the uterine cavity is in general from six to eight inches in length. I have seen it measure between eight and nine inches in three women, who each died within twenty-four hours after delivery, with the organ imperfectly contracted. In one of these cases death apparently resulted from the introduction of air into the venous circulation through the free openings of the uterine sinuses; the second sank after a twin labour and severe hemorrhage; the third died about six hours after delivery, having laboured under convulsions and deep coma during the whole previous day; and in both these last cases extensive and well-marked granular disease of the kidney was found on dissection.[1] In the course of the natural changes of the puerperal state, the uterus gradually diminishes and regains its natural size in the course of four or five weeks, and, in some, not till a longer period after parturition. In two cases which I have lately seen, where it was requisite for the purposes of criminal law to ascertain the existence of the signs of delivery, the uterine cavity was, about the seventh day after the accouchement, still between four and five inches in length. In a third case, in which the date of the parturition is still uncertain, two most intelligent medical men gave in a report, certifying the existence of all the ordinary signs of delivery upon the body of a woman nearly fifty years old, with the single but important exception, that no uterine tumour could be felt by them above the pubis, probably in consequence of the organ being so flaccid or so low in the pelvis, as not to be felt by the common hypogastric examination. Eight days subsequently, I saw the accused along with one of the medical reporters, and at that time found that the uterine cavity still measured fully four inches in length, and that the fundus of the organ could be pressed easily forwards by the end of the introduced bougie, so as to make us both perfectly certain of the existence of enlarged uterine tumour. This completion of the evidence was the more satisfactory, as the person still pertinaciously denied the crime of concealment in connection with child-murder, on an accusation for which she was at the time incarcerated, and the proof, independently of the facts ascertained by the medical witnesses, was very vague and uncertain.

In this last case, the use of the bougie proved the presence of the enlarged uterus, when, as long as a week previously, it could not be felt above the pubes by an abdominal examination carefully con-

[1] The footnote proper to this place will be found as text at p. 295.—J. W. B.

ducted in the ordinary mode. It showed the uterine tumour to exist when it could not be felt by the usual means of examination. In other instances of the same kind, it may prove useful in the converse way, by demonstrating the tumour that may be felt, not to be formed by the enlarged uterus. Dr. Montgomery, in his essay *On the Signs of Delivery*, justly states, that "the chief points of attention ought to be the state of the *uterus*, of the external parts, and of the breasts." [1] But in regard to the first of these, as felt above the pubes, he properly remarks, "a tumour may be felt so situated, and yet may not be the uterus." [2] The introduction of the bougie into the uterine cavity would at once decide this point.

In any doubtful case, the evidence derivable from the measurement of the uterus might be made the more complete by repeating it from time to time, so as to note the gradual diminution of the length of the organ, till it ultimately returned to its natural size.

This sign, like all the other proofs of delivery, can never be relied upon alone, but must always be taken in connection with the other data that are present. It may be considered, however, as an addition to their number, which is the more valuable in this respect, that it can be ascertained at a date later than most of them. To render its evidence still more certain and precise, it would be necessary to know the general rate of diminution in the length of the uterine cavity after delivery, and its variations. An extensive series of observations, both upon the living and dead subjects after delivery, could alone fully determine these points. The examinations of puerperal uteri after death, which have been recorded by Ruysch, Roederer, Montgomery, etc., will aid in such an inquiry.[3]

In cases of feigned delivery, the sign that we have pointed out from the measurement of the uterus, might be equally useful in demonstrating the organ to be of its normal length and dimensions.

[1] P. 317. [2] P. 307.

[3] I may add, that in one of the women above alluded to, and whom I saw in prison, along with Dr. Graham Weir, we detected another sign of delivery, not hitherto pointed out, as far as I know, by any medical jurist. All of them mention the value of the evidence afforded by the tactile examination of the os uteri. The *visual* examination of this part with the speculum afforded in the instances alluded to a still stronger proof. The swollen, ecchymosed, and gaping state of the labia and os uteri presented such striking peculiarities, as made it almost impossible to confound it with any other morbid condition of the parts, such as the inequalities, ulcers, etc., attendant on syphilis, and against the similarity to which as ascertained by touch, Gardien (*Traité d'Accouchemens*, tom. i. p. 132) so particularly guards us.

3. *Increased Length in Metritic and Congestive Hypertrophy of the Body of the Uterus.*—When the body and fundus of the uterus are the seat of any continued morbid irritation, the walls of the organ become hypertrophied in the same manner, though by no means to the same degree, or with the same uniformity, as under the continued normal irritation of pregnancy. The most common pathological cause of uterine hypertrophy, when uncomplicated with organic disease, is chronic congestion or metritis. It happens in hypertrophy from this source, that, as in cases of excentric hypertrophy of the heart, the cavity of the organ becomes in general enlarged, along with the enlarged state of the parietes. This enlargement of the cavity generally takes place in all directions, so that it is increased in its length, as well as in its other dimensions. The increase of length or elongation of the uterine cavity may be ascertained and measured by the bougie. There are as yet few or no precise data which can be referred to, to indicate the degree of hypertrophy, and consequent elongation in such cases. In an excellent specimen of simple hypertrophy of the uterus, contained in Dr. William Hunter's museum, the length of the cavity of the organ, from the os to the fundus, is exactly three inches and one-fourth. It is set down in the catalogue, as a "Uterus slit open from before; it is the size of the impregnated uterus at two months; the woman, however, was not pregnant, but had the furor uterinus."[1] The hypertrophy and accompanying elongation may be occasionally greater. I have repeatedly found the uterine cavity measuring as much as three and a half inches. When speaking of hypertrophy as a result of chronic metritis, Boivin and Dugès observe, that in this state "the uterus is often distended throughout, and its volume assumes the dimensions presented in the second month of pregnancy." And they add, "In some cases it enlarges so as to fill the hypogastrium, and reach the umbilicus."[2] "With this state (of simple hypertrophy)," says Dr. Hooper, "the whole of the uterus is of a preternatural size, more especially the body of the uterus, without any other morbid or unnatural appearance; and this increase of size is caused by an unusual formation of the healthy structure of the organ. With regard to the extent of this unnatural occurrence, I have found the uterus more than twice the usual size; and this may be considered as the mean, or most common size in hypertrophy; but it is sometimes much larger."[3] "I have known,"

[1] Printed Catalogue, p. 147, No. 97, s. [2] Chapter on Chronic Metritis, p. 352.
[3] *Morbid Anatomy of the Human Uterus*, p. 5.

observes Dr. Burns, "the cervix thicker, the body evidently swollen, and, if not deluded, the fundus rising *above* the pubis, and yet the tumour disappear."[1] Dr. Hamilton says he has seen the "uterine tumour as large as the womb in the fifth month, and yet it was removed."[2]

We would qualify these remarks upon the increased admeasurement of the uterus in congestive or inflammatory hypertrophy, by adding that, judging from our own experience of it, probably this mode of physical diagnosis will, in the morbid condition under consideration, be found of more use practically in showing us with sufficient precision the gradual diminution of the organ, and hence the rate of progress towards recovery, under the treatment that we may be following, than in forming by itself, in the first instance, a perfect diagnostic criterion of the original existence of the disease. For we must hold in view, that the length of the cavity of the organ is, from natural conformation, liable in different persons to exceed the usual standard by a few lines, even when no disease is present; and in chronic hypertrophy the increase of the longitudinal dimensions of the uterus will not be to any very marked or notable extent, unless the affection has proceeded to a considerable degree. Besides, there may exist, although we cannot call to our recollection any example of it, a form of metritic enlargement, in which, as sometimes occurs in the heart, the hypertrophy is concentric, and not excentric, to borrow the cardiac nomenclature of Bertin, and where the length of the uterine cavity would consequently not be increased by the presence of the disease.

In employing the bougie in the diagnosis of simple hypertrophy of the uterus, the instrument is of use in other respects than by merely enabling us to measure the length of the uterine cavity. It gives us at the same time the power of examining, in the mode that we have already shown, much more accurately than we could otherwise do, the condition of the fundus and anterior and posterior walls of the uterus, through the abdominal parietes and rectum—so that we can at the same time ascertain, that while the organ is increased in length, its external surface is quite regular, and presents none of the inequalities which indicate the existence of any more fixed or formidable organic change.

4. *Longitudinal Hypertrophy of the Uterus, and especially of the Cervix.*—In that form of simple or metritic hypertrophy which we have last described, the morbid enlargement of the organ affects

[1] Burns' *Principles of Midwifery*, p. 122, 10th edit. [2] *Pract. Observ.* p. 65.

equally all its dimensions, and increases its breadth as well as its length. Occasionally, however, it happens, that in hypertrophy of the uterus, the increase in the dimensions of the organ is principally, or even entirely, in its longitudinal direction, and that in consequence the uterine cavity becomes so elongated, as to afford us a much more decisive physical sign of its morbid state when submitted to the measurement of the Uterine Sound. One of the most remarkable examples of this type of uterine hypertrophy hitherto placed on record is that mentioned by Dr. Kennedy, in an excellent paper[1] in the *Dublin Journal*, as having occurred in a case of extra-uterine gestation. The uterus was "developed in its length, with very little increase of breadth, to the extent of twelve inches."[2]

When this longitudinal hypertrophy takes place in the unimpregnated uterus, it almost always results from morbid elongation of the cervix. The body and lips of the organ are natural in size and dimensions; but the intervening part, or cervix, appears as if its tissues had become ductile, and been extended and drawn out to a greater or less degree. The elongated cervix may either retain its normal diameter, or, as more rarely happens, it is attenuated in thickness nearly in proportion to its increase in length.

Two different varieties of the morbid hypertrophy that we are considering seem to occur, and have not been sufficiently distinguished by authors. In one, the elongated portion of cervix is placed altogether *above* the reflection of the roof of the vagina; in the other, the hypertrophy is situated *below* that reflection, or affects only the vaginal cervix, as it has been termed. In the former variety, the altered uterus is reduced in form to the shape and type of the organ in infancy. We have seen this variety in some cases of complete procidentia of the uterus,[3] and found the uterine canal, as measured by the bougie, to be stretched out to four and five inches in length. Mr. Heming supposes that this form of cervical elongation is most apt to take place in connection with prolapsus of the uterus, "complicated with hernia at its posterior part," whilst the cervix remains unchanged in prolapsus "complicated with hernia at its anterior part."[4] I have examined one case where the reverse holds

[1] "On Hypertrophy of the Os Uteri."—*Dublin Journal of Med. Science*, vol. xiv. [2] P. 321.

[3] See good illustrative sketches of this form of the neck of the uterus in the case of prolapsus uteri figured in Cloquet's *Pathologie Chirurgicale*, 1831, pl. viii. fig. 3, and Froriep's *Chirurgische Kupfertafeln*, t. 417, figs. 1 and 4.

[4] *Med. and Phys. Journal*, vol. lxviii. p. 107.

true; the os uteri is prolapsed an inch or two beyond the vulva, and the cervix much elongated; but the posterior wall of the vagina remains *in situ*, forming a deep reflection behind the protruding tumour; and the anterior wall of it with the bladder forms part of the external swelling. I may add that this variety of hypertrophy is met with also in instances in which the elongation of the body of the organ takes place in connection with the presence of fibrous or other tumours, when they happen to drag and raise upwards into the abdomen the fundus uteri, while the cervix remains fixed. Cruveilhier has represented an example of this complication, in which the canal of the cervix alone is stretched out to the length of five or six inches.[1]

When the portion of cervix which is below the vaginal reflection is hypertrophied, the elongated structure projects downwards from the vaginal roof, like the cylindroid finger of a glove or a cow-teat. I have had occasion to excise one, in consequence of the constant discomfort which it produced. In another case of this kind, in which the patient has suffered often from recurrent attacks of severe uterine irritation, and has the os uteri almost projecting through the vulva, the neck of the organ is about two inches in length, and the body of the uterus is, as I have ascertained by the sound, acutely bent or retroflected backwards and to the right; and it has its fundus firmly adhering in this anormal position to the pelvic peritoneum, covering a firm solid tumour lodged behind the rectum, and filling up the upper part of the hollow of the sacrum. The shape and consistence of the tumour at first gave me the idea that it was one of those osteo-sarcomatous masses that are sometimes seen in this locality; but the use of the exploring needle showed that the induration was not from any bony deposit. When of still greater size than in these instances, the hypertrophied cervix has prolapsed externally, and by its shape and configuration has been mistaken for the male penis. Some of the cases of spurious hermaphroditism in the human female, as those described by Saviard, Valentin, and Home, appear to have been merely examples of this disease.[2] Its presence generally prevents impregnation; and in fact, the tapering, conical form of the cervix uteri, which is so commonly found in women long married without becoming mothers, is a minor degree of this same diseased state. Ollivier, Lisfranc, and others, have mentioned the frequent connec-

[1] *Anat. Path.*, livrais. xiii. pl. 2.

[2] Dr. Todd's *Cyclopædia of Anatomy*, vol. i. p. 690.

tion of this state with sterility; and I have repeatedly had occasion to verify it. In a case that came under the care of Dupuytren, the elongated cervix was reduced to its natural length by the knife. The patient had been previously eight years married, and asked medical advice on account of her want of family. Two months after the operation she became pregnant.[1]

The morbid elongation of the cervix uteri is spoken of by Roux as "a pretty frequent condition (*état assez fréquent*), and one that has been hitherto mistaken for procidentia or prolapsus by the greater number of practitioners."[2] Roux ascribes the first notice of this morbid state to Lallemand and Bichat.[3] It was, however, long before described by Morgagni,[4] Levret,[5] and Hoin,[6] and has since been commented upon at greater or less length by Desormeaux,[7] Murat,[8] Gardien,[9] Dance,[10] Heming,[11] Boivin and Dugès,[12] Lobstein,[13] Cruveilhier,[14] Davis,[15] Kennedy,[16] etc. etc.

The longitudinal hypertrophy of the cervix uteri is liable to be confounded with other morbid states of the organ. "This disease," says Dr. Kennedy, "has been mistaken for polypus, and its removal has been attended with fatal results. In the hypertrophy of the neck, from the os remaining open, with the exception of its altered position, it is, however, most likely to be mistaken for prolapsus. The detecting, by a carefully conducted examination per vaginam, and, if necessary, by the rectum, the elongated or outstretched neck of the uterus, whilst the fundus of the organ is perceptible of its natural size, and in its usual position in the pelvis, will sufficiently establish the diagnosis."[17] The exact height and position of the fundus uteri, which are thus requisite for the diagnosis in some cases, can only, as we have already shown, be ascertained by the aid of the bougie, when the abdominal parietes are sufficiently dense to oppose a perfect tactile examination at the hypogastrium. In hypertrophy of the cervix, the use, however, of the bougie is still greater

[1] Dumont's *Thèse sur l'Agénésie, l'Impuissance, et la Dysgénésie*—Paris, 1830. No. 2231; and Archives *Gén. de Médecine*, t. xxv. p. 266.

[2] Preface to Bichat's *Anatomie Descriptive*, t. v. p. 7. [3] *Ib.* t. v. p. 282.

[4] Epist. xlv. obs. 11. [5] *Jour. Ancien de Méd.* tom. xl.

[6] *Journal de Médecine*, tom. xl. p. 352. [7] *Dict. de Médecine*, tom. ii. p. 12.

[8] *Dict. des Sciences Méd.*, tom. xxxi. p. 186.

[9] *Traité d'Accouchemens*, etc., tom. i. p. 118.

[10] *Archives Générales*, tom. xx. p. 524, 1829.

[11] *Medical and Physical Journal*, vol. lxviii. p. 107. [12] Tom. i. p. 193, etc.

[13] *Path. Anat.* tom. i. p. 57.

[14] *Anat. Path.* livraison xxxiv. pl. 2. [15] *Obstetric Medicine*, p. 208.

[16] *Dublin Journal*, vol. xiv. p. 322. [17] *Ibid.*

in another view. "A sound," says Desormeaux, in his article on *Allongement du col de l'Utérus*, "carried into the os tincæ penetrates to the depth of five, six, seven inches, or even more." This last circumstance," he observes, "is primarily important in fixing the diagnosis."[1] Desormeaux is at the same time certainly wrong when he adds that we may thus "easily distinguish elongation of the cervix from complete prolapsus of the uterus, inasmuch as, that in the latter a sound would scarcely penetrate above two inches in depth." In complete prolapsus, the uterus, it is true, does occasionally retain its normal length; but as I have already stated, the reverse is much more generally the case, and the prolapsus is usually accompanied with cervical elongation of the organ, more especially if its fundus, as it very often happens, has become morbidly adherent to some of the neighbouring portions of pelvic peritoneum, during the course and increase of the displacement. Even in simple and incomplete prolapsus, the uterine cavity is not unfrequently somewhat elongated; because that prolapsus in recent and subacute cases is very often the *result* merely of the general hypertrophy and increased weight of the organ; and here its increased length may so far form a valuable sign, in showing that in the treatment we must act against the hypertrophy, as the pathological cause, before we can hope to ameliorate the prolapsus, which is simply its mechanical effect.[2]

When the cervix is elongated downwards from the upper part of the vagina, we may easily measure by the uterine sound, and by a finger in the vagina, the exact extent of its morbid prolongation; and, on the other hand, when the hypertrophied portion is situated above the vaginal roof, we may attain the same object by tracing with a finger, in the posterior reflection of the vagina, or in the rectum, the progress of the sound as it passes upwards through the elongated and tapering cervix, until it reaches the entrance (and there the canal is generally contracted) of the cavity of the broader

[1] *Dictionnaire de Médecine*, tom. ii. p. 13.

[2] The partial prolapsus, which often takes place in metritic hypertrophy, "furnishes," observes Dupareque, "the means of assuring ourselves more directly of the state of the uterus. Unfortunately, practitioners rarely know how to profit by it. They consider solely the prolapsus, and apply a pessary, and they are astonished when it cannot be borne, or that, so far from putting an end to the various pains and uneasinesses which they attributed to the prolapsus, the presence of the instrument exasperates them, or becomes even the exciting cause of more serious alterations."—*Traité sur les Altérations Organiques de la Matrice*, p. 201.

and bulging out body of the uterus itself. In making such an examination, we must guard against the error of supposing the instrument to be fully introduced into the cavity of the body of the uterus, when it has only reached the upper part of the occasionally dilated cavity of the cervix. Lobstein describes an instance of the disease in which the error might have been easily fallen into. "The museum," he observes, "of our faculty (at Strasburg) contains a very interesting example. The neck of the uterus has a length of three inches and one line, its thickness at its superior part is six lines; in descending it becomes enlarged, and its cavity dilated so as to give it a size of an inch and seven lines. At first view it looks like a piece composed of two uteri touching each other by their necks; no change of tissue is discoverable."[1]

5. *Hypertrophy of the Uterus and Uterine Cavity, from the growth of Fibrous Tumours in the Parietes of the Organ.* — When fibrous tumours, the most common of all the organic diseases of the uterus, grow in the walls of the viscus, they are generally accompanied with a hypertrophied condition of the uterine parietes, exactly resembling in its nature and appearance their hypertrophied state in pregnancy. Under the irritation of an isolated fibrous tumour or tumours the surrounding hypertrophy is usually local in its seat, and confined to the uterine walls in its immediate vicinity; when the fibrous masses are larger or more numerous, the uterine hypertrophy becomes more general.[2] I have a preparation of a case of this kind, in which the organ resembled in size, and in the thickness and characters of its parietes, the uterus of the female a day or two after delivery. "The natural substance of the uterus," observes Dr. Hooper, in which this tumour is imbedded, is almost always found to have undergone a decided change, having become more distinctly fibrous, and the fibres more obviously fasciculated. The

[1] *Traité d'Anat. Pathologique*, tom. i. p. 57.

[2] "The hypertrophy of the uterus is," observes Cruveilhier, general when the fibrous tumour directs itself towards the side of the uterine cavity; it is partial when the tumour follows an opposite course; if it occupies the fundus it is the fundus alone which becomes developed, and the rest is moulded upon it; if the anterior wall is its seat, it is the anterior wall which becomes developed; if it approaches the peritoneum, the fibres intervening between it and that membrane undergo the change. In the cases of partial hypertrophy of the uterus, the remainder of the organ may be in its natural state; but this is rare, because if the uterus is not solicited to development in the direction of its thickness, it is so in the direction of its *height*, in consequence of the slow or rapid increase of the fibrous bodies. Now a development in height or length is still always a hypertrophy."— *Anat. Pathol.* livr. xix. pl. 1, 2.

quantity of these fibres, that is of the natural fleshy fibres of the uterus, is very much increased, so that the diseased structure is often surrounded by walls much thicker than those of a healthy uterus." "In these instances," he remarks in another page, "the uterus very much exceeds its natural bulk and weight after the morbid structure has been completely removed. I have found the uterus in many of these cases weigh two pounds, after having dissected out masses of subcartilaginous (fibrous tumours) or other substances." [1]

In cases of fibrous tumours leading to uterine hypertrophy in the manner just described, the cavity of the uterus is frequently enlarged, as well as its parietes. "When fibrous tumours," says Bayle, in his admirable essay on this disease, "are numerous or very large, they deform altogether the body of the uterus. Almost always when they become so large as a man's head, they enlarge (*aggrandissent*) the uterus in every direction, and dilate considerably its cavity (*dilatent considérablement sa cavité*)." [2]

The cavity of the uterus, however, is not always enlarged, even when the fibrous tumours are both large and numerous. This result, in regard to the cavity, seems to be regulated by the seat and relations of the tumours. We have observed in the disease the three following conditions of the uterine cavity :—

First, The cavity is elongated and enlarged with the enlarging state of the tumour and uterine parietes, when the morbid mass grows from any point towards the interior of the organ, or when it is originally situated in the lateral walls of the body of the uterus, and so during its development tends to stretch out these walls, and consequently the contiguous cavity along with them, in a longitudinal direction.

In cases in which the fibrous tumour is seated on one side or wall of the organ, and becomes of a great size, the lengthened uterus sometimes comes to be wrapped and welded for some distance around the exterior surface of the fibrous growth. "I have seen," says Cruveilhier, "in these cases the uterus considerably elongated, and form a kind of a half-belt (*demi-cintre*) around the tumour." [3] The degree of elongation and dilatation of the uterine cavity under these circumstances is very various. I have repeatedly found it, both upon the living and dead subject, measuring three, four, and five inches in depth. Madame Boivin describes and represents a uterus of a conical shape, containing in its parietes

[1] *Morbid Anatomy*, pp. 11 and 6. [2] *Dict. des Scien. Méd.* tom. vii. p. 72.
[3] *Anat. Path.* livr. xiv. pl. 1, 2.

several fibrous tumours, and having its cavity prolonged in the form of a narrow canal, to the length of nine inches.[1] I have in my museum a preparation of this kind, in which the uterine canal measures above ten inches. The greatest elongations of the uterine cavity that I have as yet ascertained by the bougie in cases of fibrous tumours in the living subject, are two instances where the canal was, in the one six inches in length from the os uteri to the fundus, and in the other seven and a half inches. Dr. Beilby saw with me the former, and Dr. Girdwood of Paddington the latter case, and both of these gentlemen assured themselves, by personal examination with the uterine bougie, of the accuracy of the measurements that I have stated. This hypertrophy of the walls and cavity of the uterus seems liable to occur in its greatest degree when the tumour or tumours are rapid in their growth, and make their appearance during the child-bearing periods of life. In using the bougie in these cases the instrument sometimes requires to be so much unbent as to be nearly straight before it can be introduced; and where the elongated uterus curves around the exterior of the fibrous mass, the apex of the sound must be passed so as to follow the particular direction of the uterine cavity.

Secondly, The uterine cavity may retain nearly its natural dimensions and depth, or be only very slightly increased, even when the fibrous tumours are both large and numerous, provided they grow from any part towards the exterior surface of the organ, or are originally seated in the fundus uteri and not in its lateral parietes. I have seen a mass of uterine fibrous tumours so large as to have been mistaken by one practitioner for an enormous hepatic growth, where the uterine cavity was only about three inches in depth. In this instance the tumours were evidently all growing from the peritoneal surface of the uterus, and could be felt through the thin abdominal walls adhering to it with pedicles of varying sizes, like a number of exterior polypi.

Thirdly, In connection with the existence of fibrous tumours in the uterus, the uterine cavity may be found apparently shortened in consequence of some portion of it being obliterated by adhesive inflammation from the pressure together of its opposing surfaces by the presence of the tumours. I shall state afterwards a case of this kind, where the uterine canal, as examined from the vagina, appeared only an inch in depth. In this, as in most other such cases, the cavity of the body was found concealed higher up,

[1] Heming's *Boivin and Dugès*, p. 179, pl. 14.

enlarged to some degree, but forming a short cavity from the obliteration of its inferior part. This result, as the effect of the presence of fibrous tumours, is principally observed when the tumours have been of very long standing, and when the hypertrophy of the uterine tissues that accompanied their earlier development has at last been followed by a state of atrophy of the included and compressed walls of the organ.

The practical deductions that may be drawn from the preceding remarks regarding the length of the cavity of the uterus in fibrous tumours of the organ, are so evident as to require little or no comment. I have already stated my opinion, and would repeat it here in the strongest terms, that no error is more common in practice than to mistake a fibrous tumour of the uterus for a dropsical ovary, or a dropsical ovary for a fibrous tumour.[1] I shall take another opportunity, in these contributions, of offering some suggestions for the more perfect diagnosis of ovarian tumours, and their connections. In the meantime I may merely state that in the *lengthened* state of the uterine cavity, as easily ascertained by the bougie during life, we have, in many instances, an additional physical sign between the two classes of diseases alluded to, subject to exceptions which I will subsequently mention; and if the elongated uterine cavity is discovered by the bougie to run *behind* the tumour that is present, it is another and still more decisive reason for concluding that the affection is uterine and not ovarian. At the same time it is to be held in recollection that if the uterine cavity is of its *natural* depth, it is no sufficient reason that the hypogastric or abdominal growth is not a fibrous uterine tumour, and more careful examination under such circumstances will often show the tumour or tumours to be such, and to have either a more or less pediculated form, and attachments to the external uterine surface, or to be imbedded in the walls of the fundus. Lastly, the uterine canal is sometimes greatly *shortened* in the way described, in connection with the existence of fibrous tumours in the uterine walls. I am not aware that it is ever in this way diminished in depth from the presence of ovarian disease.

[1] In illustration of this remark, I shall content myself with adducing one fact. Few men in England seem to have attended more zealously to the subject of ovarian tumours, and no one has laboured so much to reintroduce the excision of them, as Mr. Clay of Manchester. Yet out of five cases which he has lately recorded, of operations for the extirpation of enlarged ovaries, in two it was found, after the abdomen had been laid open, that the disease was not ovarian, but consisted "of anomalous and uterine tumours."—See his *Cases of Peritoneal Section for the Extirpation of Diseased Ovaria*, p. 18.

6. *Enlargement and Distension of the Uterus, from Polypi, etc., in its Cavity.*—When polypi or other morbid structures form in the cavity of the uterus, they act like the presence of an ovum, enlarge the interior of the organ in proportion to their growth and size, and generally at the same time induce, as in pregnancy, a corresponding degree of thickening and hypertrophy in the uterine parietes. In such cases the uterine bougie shows an increased depth of the uterine cavity. The degree of increase will necessarily vary in every different instance. I have seen a retained polypus enlarging the uterus to the size of the organ at the fourth month of pregnancy. Cruveilhier has represented a large fibrous polypus as included within and distending the uterine cavity, so that the organ measured above eight inches from the os to the fundus. We shall see afterwards that it is not the mere length to which the bougie may pass that forms the diagnostic mark under such circumstances, but that it is by the possibility of passing it on more than one side between the surface of the tumour and the interior of the uterus, or by the power of so far revolving it round, and isolating, as it were, the contained mass, that we draw the distinction between tumours situated in the cavity and those which, as described under the last head, are still imbedded in the parietes of the organ.

7. *Elongation of the Uterus in Hernia of the Organ.*—Hernia of the unimpregnated uterus is a disease of very rare occurrence. The organ, however, has been found protruding into the tumours formed by different varieties of abdominal hernia. It had passed through the crural ring in cases met with by Lallemand[1] and Cruveilhier ;[2] through the inguinal canal, in instances detailed by Desault and Chopart,[3] and Lallemand.[4] Most of the cases of hernia of the impregnated uterus which have been recorded by Sennertus, Hildanus, Ruysch, Ladesma, Fisher, etc.,[5] were instances in which the uterus seems to have become displaced after conception took place.

When the unimpregnated uterus forms the subject of hernia it seems in general to be considerably elongated. In Chopart's case the organ is described as smaller than usual, rounded and lengthened in form (*arrondie, allongée*) ; in Cruveilhier's plate the displaced

[1] *Bulletins de la Faculté de Médecine*, 1816, tom. i. p. 1.

[2] *Anat. Pathologique*, livr. xxxiv. pl. vi.

[3] *Traité des Maladies Chirurgicales*, tom. ii. p. 305.

[4] *Mémoires de la Soc. Méd. d'Emulation*, 3me année, p. 323.

[5] See the details of them collected by Dr. Cormack, in *Edinburgh Monthly Journal* for 1841, p. 491, and *ibid.* for 1842, p. 28.

viscus is represented as drawn out to the length of five or six inches. In fact, the uterus itself must in all such cases be either much drawn out in length, in order to allow its fundus to be the subject of such great displacement, or the vaginal canal must be extended into the neck of the hernial sac, as happened in the example already referred to, as recorded in the *Bulletins de la Faculté de Médecine.*

In one of the cases of hernia of the uterus described by Lallemand, the patient applied for advice in consequence of the supervention of symptoms of strangulation. The sac, on examination, was supposed to contain a portion of intestine ; but the age of the patient, etc., prevented an operation being attempted. On examination after death, the hernial tumour was found to be composed of two folds of omentum, two hydatic cysts, the ovaries, Fallopian tubes, and uterus. In relation to the difficulty of the diagnosis in this and similar cases, Murat observes, that " hernia of the unimpregnated uterus is most frequently confounded with that of other parts of the abdomen, and there are *no* pathognomic signs by which we can recognise it."[1] We may, as Nauche advises, so far overcome the difficulty, by finding, on vaginal examination, " the uterus situated high in that canal more or less devious, the orifice turned to the side opposite that of the hernia, and on pressing it with the finger, we impart a certain mobility to the hernial tumour."[2] A much more decisive means of solving the problem will be afforded by the use of the uterine bougie. If, instead of trusting to the preceding points as ascertainable by the examination of the os and cervix with the finger, we pass the bougie into the uterine orifice and its elongated cavity, both the direction which the instrument will, during the course of its introduction, take towards and into the mass of the tumour, and the power of feeling its apex in the fundus uteri, through the hernial walls, after it is fully introduced, will at once place the matter beyond the possibility of doubt. In this procedure it will be proper to recollect, that in some cases a slender, and it may be even a flexible bougie will be required, in order to overcome the contractions and irregularities of the uterine cavity that may be present.

[1] *Dict. des Sc. Méd.* vol. xxxi. p. 228. [2] *Maladies de l'Utérus*, p. 114.

Section IV.[1]

ON THE MEASUREMENT OF THE CAVITY OF THE UTERUS AS A MEANS OF DIAGNOSIS IN SOME OF THE MORBID STATES OF THAT ORGAN —*continued.*

In our last communication we described a number of morbid conditions of the uterus, in which the cavity of that organ is more or less elongated. We showed that the diagnosis of these affections could be greatly advanced by ascertaining, through the use of the uterine bougie, the exact extent and degree of the existing elongation. It was at the same time remarked that in some pathological states of the uterus its cavity is shortened and diminished in depth. On the present occasion, we purpose to describe briefly this latter set of cases, and will point out in what respects their discrimination during life may be promoted by the employment of the uterine sound.

INSTANCES OF DIMINISHED LENGTH OF THE UTERINE CAVITY.

The cavity of the uterus, when shorter than natural, may have its depth diminished as the result of malformation, of disease, or of displacement.

1. *Preternatural shortness of the Uterus from original malformation of the organ.*—Few of the malformations of the uterus, with the exception of the duplicity and absolute deficiency of the organ, have as yet attracted much attention. It would, however, be easy, we believe, to bring together, by a little patient research, a considerable series of cases, in which the organ was found less than its normal length by an inch or an inch and a half.[2] In some instances, in fact, the cervix of the uterus is alone present, and the body and fundus of the organ are imperfectly or totally undeveloped. In more strict terms, the lower extremities of the Fallopian tubes, instead of coalescing and becoming evolved into the body and fundus of the uterus, remain separate, retain their tubal character, and open into the superior part of the single cavity of the cervix. Such appears to us to be the explanation of the case, for example, described by Lauth, in which the cervix was sufficiently well formed, with the tubes

[1] See *London and Edinburgh Monthly Journal of Medical Science*, March 1844, p. 208.

[2] For further remarks on this subject, see p. 601.

opening into it almost directly, and only separated by a small cavity.[1] Morgagni speaks of a uterus in which the distance from the os to the fundus was not so much as the breadth of the thumb. The genital organs were in other respects malformed.[2] Dr. Dewees mentions an instance of amenorrhœa, in which the uterus was of "a size not exceeding the thumb of a man."[3]

In that particular variety of malformation which various pathologists have described under the name of "oblique uterus," and where the organ originally lies with its fundus directed to one side of the pelvis, and has one set of its lateral ligaments shorter than another, the organ is sometimes, though not always, shorter than natural. Tiedemann describes an oblique uterus two inches and a line in length, and in which the cavity would measure considerably under two inches.[4]

In all cases in which the uterus is malformed and shortened in the modes we have alluded to, the uterine sound will probably afford us important diagnostic information, by enabling us to measure the exact degree of diminution in the length of the cavity of the organ. To make the information more certain and precise, it will be necessary at the same time to ascertain, by a hypogastric or rectal examination, that the apex of the instrument has really reached the superior end of the uterine body, and hence, that it is not arrested in its progress by any structure in the cavity, or by any flexion in the walls of the viscus, such as we shall afterwards fully describe.

2. *Uterine canal shortened from stricture or partial obliteration.*— "A stricture," says Dr. Baillie, "is sometimes formed within the cavity of the uterus, so that its cavity at one part is obliterated entirely. This," he adds, "I believe almost always to take place at one part, namely, where the cavity of the fundus uteri terminates, and that of the cervix begins, for in this place the cavity of the uterus is narrowest. As the sides of the cavity round this place lie very near each other, and form naturally a small aperture, it is probable that some slight inflammation may unite the parts together, and shut up the aperture; or the parts may gradually approach each other without this cause, as in the stricture of the urethra."[5]

[1] Andral's *Anatomie Pathologique*, tom. i. p. 677.
[2] Epist. xlvi. 20, Alexander's Translation, vol. ii. p. 661.
[3] *System of Midwifery*, p. 69, ed. of 1837.
[4] *Von den Cowperschen Drüsen des Weibs*, etc., p. 26.
[5] *Morbid Anatomy*, edit. of 1812, p. 379.

The morbid state which Dr. Baillie has so accurately described in the above quotation, as the result of his observations upon the dead body, could only be detected upon the living subject, by examination with a uterine probe or bougie. Nor would the diagnosis be difficult, for at the same time that it was found that the bougie was completely arrested in its progress upwards, at the distance of an inch, or an inch and a half, from the os tincæ, it might be ascertained by a hypogastric examination, that it was still far from having reached the fundus uteri.

Since the time that Dr. Baillie wrote, Professor Mayer of Bonn has shown that in old persons, the os internum or cervico-uterine orifice is so often obliterated, that it may be almost looked upon as a normal condition, connected with the general atrophy of the viscus that takes place in very advanced life.[1] In one or two aged patients I have found it impossible, during life, to pass the smallest probe through the os internum, probably owing to the contraction in question. The cases I allude to were those of females who in earlier life had produced children, and where there was therefore no original stricture or malformation.

Stricture of the os internum is, like diminution in the size of the os tincæ, not unfrequent in females affected with dysmenorrhœa, and who, though married, have never had children. In several cases I have met with difficulty and obstruction in passing through the opening between the cavities of the neck and body of the uterus, a sound or probe that had already passed easily and freely through the os tincæ. I have at present under my care a case of this kind, in which there is a most remarkable degree of antroversion of the whole uterus. Jahn, in his *Essay on the Oblique Uterus*, mentions an instance of that malconformation where, after death, the os internum was found so narrow that a fine probe could not be passed through it (*ut subtillissimo stilo transitum denegaret*); and yet the os tincæ was well formed.[2] In Ruysch's *Catalogue* a uterus is mentioned, with the os internum so small as not even to admit the head of a small needle (*ne caput quidem aciculæ minoris admittere posset*).[3]

Occasionally the whole cavity of the body of the uterus is obliterated, from the os internum to the fundus, and yet the cavity of the cervix continues patent. Cruveilhier speaks of having seen a case of this kind, "in which there was no trace of a cavity in the

[1] *Beschreibung einer Graviditas Interstitialis Uteri*, p. 14.
[2] *De Situ Uteri Obliquo*, in *Schlegel's Sylloge Operum Obstetr.* tom. i. p. 268.
[3] *Thesaurus Anatomicus*, vi. No. 85.

body of the organ, although the cavity of the neck remained."[1] An example of the same kind has been represented by Madame Boivin in the plates attached to her treatise on diseases of the uterus.[2]

The cavity of the uterus is, in some rare cases, partially obliterated, in consequence, as has been already stated, of the development of fibrous tumours in the walls of the organ. Under such circumstances, the obliteration is the result of inflammatory adhesions, formed between those portions of the opposed surfaces of the lining membrane of the uterus, that happened to be maintained in a state of close and morbid apposition, by the presence and pressure of the neighbouring tumours. The adhesive inflammation thus excited occasionally extends to some distance from its original seat. In all cases, however, the cavity of the cervix seems to escape, and the portion of the cavity of the body that is placed above the stricture frequently becomes distended and enlarged, from the accumulation of morbid mucous secretions within it. Cruveilhier has described a very illustrative case of this kind.[3] A preparation was presented to the Anatomical Society of Paris, as a morbid ovary. In external appearance, it had much more resemblance to an ovarian than an uterine disease. On more minute examination and dissection, however, it was found to consist of an agglomerated mass of fibrous and fibro-calcareous tumours, the whole forming a shapeless body, with an irregular, tuberculated surface. The tumours varied in size from a pea to a large compound one weighing by itself about 1½ pound. On cutting into the midst of the mass, a cavity was found, filled with reddish serum, which it was easy to see was the cavity of the body of the uterus. This cavity was a shut sac, there being no opening from it. Inferiorly, its communication with the cervix uteri was entirely obliterated. When examined as to its vaginal relations, the uterus, or uterine canal, seemed to terminate at an inch above the os tincæ. A blunt stilet, adds Cruveilhier, passed in all directions, could not discover above this point any opening into the uterine cavity. If the same means had been employed, as a matter of diagnosis during life, the same result would have been obtained as in the post-mortem examination, and that result would have afforded pretty conclusive evidence that the disease was not ovarian, because the uterus does not seem to be liable to become occluded in the course of its cavity, in connection

[1] *Descriptive Anatomy*, vol. i. p. 621 of Dr. Madden's translation.

[2] See plate xiii. fig. 3.

[3] *Anatomie Pathologique*, livrais. xiv.

with ovarian growths; and besides, the use of the bougie would have shown the uterus imbedded in the tumour, and probably the partial canal of the cervix running in such a direction in relation to the tumour as to add further testimony to its non-ovarian character.

3. *Diminished depth and effacing of the Uterine Cavity in Inversion of the Uterus.*—We believe that the diminution in depth, and, in extreme cases, the total obliteration which the canal of the uterus undergoes in inversion of the organ, will generally give us the power of distinguishing this morbid state from all others to which it is symptomatically allied; and more especially from those forms of polypus that occasionally so strictly resemble it, and with which it has been frequently and sometimes fatally confounded.

When inversion of the uterus occurs immediately after delivery, it can, in general, be easily distinguished from a polypus that has passed through the os uteri after the expulsion of the child, or placenta, or both, because, omitting other considerations, though in each we may find in the vulva or vagina, if we are led to make an examination by the severity of the symptoms, a large fleshy tumour, yet this tumour, in the case of polypus, can be proved not to be the displaced uterus, as the fundus uteri can still be felt above the pubis, whilst the reverse is true of inversion. If any doubt remained, in consequence of difficulties in the way of the hypogastric examination, or otherwise,[1] a bougie cautiously passed by the stalk of the vaginal tumour, would, if it were a polypus, prove at once the uterine cavity to extend upwards to the length of six or seven inches, and if desired, would enable us further to feel more distinctly through the hypogastrium the fundus uteri still remaining *in situ*. If the tumour were the inverted fundus of the uterus, the cavity of the organ would, on the contrary, be found shortened to an inch or two on all sides, and it would be found difficult, or impossible, to bring, as usual, any part fully within the reach of an abdominal examination. In those rare instances in which the inversion was complete, the orifice and cavity of the uterus would be found entirely effaced.

The difficulty, however, of distinguishing between polypus and inversio uteri is greatly increased when the diagnosis is attempted

[1] For cases of polypus of the vagina after delivery mistaken for inversion, see Ramsbotham's *Practical Observations*, vol. ii. p. 473, and Gooch's Account of *Diseases of Women*, p. 282; and for cases of inversion under the same circumstances, mistaken for polypus, see *Gazette Médicale* for 1822, p. 422.

after the puerperal uterus has diminished to its normal volume, or when the patient applies for advice at a distance from the period of confinement, and the inversion is only partial. Under such circumstances it has repeatedly happened that a polypus has been mistaken for an inverted uterus,[1] or the still more dangerous error committed of considering an inverted uterus to be a polypus, and treating it accordingly.[2] Such errors involve not only the comfort but the life of the patient.

It is true that a diagnosis can generally be established with considerable certainty between polypus of the uterus and partial chronic inversion of the organ, by attending, amongst other points, particularly to the two circumstances, that however similar in other respects the tumour formed by inversion is, 1st,—in its history, traceable to having appeared immediately after delivery; and, 2d, in its character, it differs from polypus in being sensitive to a greater or less degree to the touch, while the polypus is not so. We must, however, at the same time, hold in view that some fibrous polypi, when they carry down before them, and are covered with a layer of true uterine tissue, or when temporarily inflamed, are found to be sensitive,[3] and that the inverted uterus becomes almost insensible when long exposed;[4] and again the fact, that the tumour first appeared

[1] See cases in *Ansiaux Clinique Chirurgicale*, p. 207; *Acta Havniensia*, 1818, tom. v. p. 51.

[2] On cases of inverted uteri mistaken for polypi, see Morgagni, *de Sedibus, etc.*, Epist. xlv. No. 4. Palletas' *Exercitationes Pathologicæ*, pp. 17, 18. Gooch, in his *Diseases of Women* (1831), p. 265, gives an instance where Dr. Hunter applied by mistake a ligature to an inverted uterus. A preparation illustrative of this error was in the museum of the late Dr. Hamilton; the patient, as in Dr. Hunter's case, having died with the uterus partially cut through with the ligature. Occasionally the uterus has been included without fatal effects: see numerous quotations in Dr. Burns' *Principles of Midwifery*, 1837, p. 128.

[3] "It is said that an inverted uterus is sensible to the touch, while polypi, on the contrary, are void of feeling. This can never be an accurate mode of forming a diagnosis, as we can only judge of the sensibility of the tumour by the expressions of the patient, which are regulated more by disposition than by the extent of her sufferings. I lately attended a lady with uterine polypus, and had I judged solely by the complaints of my patient, I should have pronounced the polypus to have been more sensible than an inverted uterus usually is."—Dr. Chas. Johnstone in *Dublin Med. Reports*, vol. iii. p. 488.

"We shall always find it difficult to distinguish between the sensibility of the tumour and sensation occurring in neighbouring viscera, which are irritated by the process of examination; while, too, it must be remembered, that the sensibility of the inverted uterus is greatly diminished in its chronic stage, and that the sensibility of polypus may be increased by the presence of inflammatory action."—Newnham on *Inversio Uteri*, p. 83.

[4] "It is said that the polypus is usually indolent, and that the fundus of the

immediately after delivery, is not itself conclusive, because in some cases of inversion the accident has not caused such severe symptoms as to be recognised at that moment,[1] and again, the first time a polypus passes from the uterus to the vagina is occasionally immediately after labour.[2] In their physical character, the two diseases often very nearly resemble one another. "When the uterus," says Dr. Gooch, "is only partially inverted, that is, when its fundus only is drawn down through its orifice into the vagina, and the patient has survived for many months, the tumour feels exactly like a polypus of the fundus. . : . In the smoothness of its surface, the roundness of its body, the narrowness of its neck, and its being encircled by the orifice of the uterus, it sometimes *exactly* resembles polypus of the fundus."[3]

To show still more strongly the difficulties which occasionally intervene in the distinction between chronic inversion of the uterus and polypus, I will adduce the testimony of one or two writers, whose authorities on this point are such as to command all confidence.

Mr. Newnham in his learned essay on *Inversion of the Uterus*, after having brought together the opinions of many authors—ancient and modern—British and foreign—upon this question in diagnosis, adds, "On reviewing the foregoing testimony we shall be induced to conclude that it is always difficult, and sometimes impossible, with our present knowledge, to distinguish partial and chronic inversion of the uterus from polypus."[4]

uterus has an exquisite sensibility, but very often one meets with painful polypi; and it must be so, since they are very often covered with the tissue of the uterus. Their lower part may be insensible, because this envelope is too thin, or it may be perforated. On the other hand, it is certain that the sensibility of the inverted uterus gets duller after a time."—Lisfranc, *Clinique de la Pitié*, tom. vii. p. 133.

"In time, the surface of an inverted uterus becomes less sensible to external impressions."—Jourdin, *Dict. des Sciences Médicales*, tom. xxxiii. p. 288.

"Dr. Montgomery has in his museum a preparation of inverted uterus which had during life been quite insensible to the application of the needle."—Dr. Burns' *Midwifery*, p. 561.

[1] "The nature and even the facts of the accident have often not been discovered till after the lapse of many days, weeks, or months subsequently; and in a smaller number of cases not till after the death of the subject."—Davis' *Obstetric Medicine*, p. 1088.

[2] Two cases of this nature are given by Levret in his paper on uterine polypi, in the *Mémoires de l'Académie Royale de Chirurgie*, tom. iii. pp. 543, 545.—See also Gardien's *Traité des Accouchemens*, tom. iii. p. 316; Delpech's *Précis des Maladies Chirurgicales*, tom. ii. p. 586; three cases in the *Journal Hebdomadaire de Médecine*, No. 44; Ramsbotham's *Observations*, vol. ii. p. 473. I have seen one come down after a premature labour.

[3] P. 255.

[4] *Essay on the Symptoms, etc., of Inversio Uteri.*—London, 1818, p. 82.

In his elaborate work on *Operative Midwifery*, Professor Kilian offers a nearly similar observation—"An inverted uterus may so deceitfully (*täuschend*) resemble a polypus that the diagnosis is scarcely possible."[1]

In a clinical lecture on inversion of the uterus, Velpeau, in alluding to the diagnosis of that disease from polypus in some very difficult instances, adds, "There are cases in which doubt is the only rational opinion (*le doute est la seule opinion rationelle*)."[2]

"When," observes Lisfranc,[3] "the polypus or inversion has only partially opened the os uteri, we are assured that the diagnosis is impossible—authors do not even consider the case." "From the facts we have adduced," he adds,[4] "one may easily conceive the immense difficulties met with in cases of this nature; thus, under a great number of circumstances, the most distinguished practitioners have believed that they had tied polypi, when they had included the organ of generation itself in the ligature; and in other cases they have supposed they had removed the uterus either wholly or in part, when they had only relieved their patients of polypous tumours."

In order to resolve the difficult problem in uterine diagnosis to which these remarks refer, Malgaigne some time ago proposed a means which is thus described:[5] "A curved catheter is introduced into the bladder; it is then carried backwards, and its concavity directed downwards, so as to bring the point of the instrument into the bottom of the uterine sac; the index finger is then introduced into the vagina, where the point of the catheter is as easily felt as it is in the hypogastrium in ordinary catheterism." Thus the diagnosis is established; "but there are circumstances," continues Lisfranc, "in which the catheter, in consequence of the adhesion of the organs, cannot penetrate into the sac of the inverted uterus; then it might be erroneously believed that we had to do with a polypus." Setting this last objection aside, we doubt entirely the applicability of such a means of diagnosis in this case as that proposed by Malgaigne. The urethra of the female is placed in such a direction in relation to the other pelvic contents, that if the stem of an ordinary male catheter be held in it, the apex of the instrument, when turned backwards, will look posteriorly to the hollow of the sacrum, and cannot, without lacerating the urethral

[1] B. ii. p. 280. [2] *Clinique Chirurgicale*, Paris, 1841, tom. ii. p. 425.
[3] *Clinique*, tom. iii. p. 135. [4] P. 136.
[5] Lisfranc, *Clinique de la Pitié*, tom. iii. p. 137.

connections, be made to return downwards towards the vagina. To enable it to do so, the instrument would require to be curved at an acute angle, and not at an obtuse—and if of the former shape, it could not be made to pass into the bladder, and even if passed, could not probably be used with safety. We make these remarks after having tried repeatedly the experiment upon the dead subject.

A more safe and easy means of distinguishing a polypus from a partially inverted uterus, will be found in the measurement of the uterine cavity, by the introduction of the sound. In some doubtful instances its aid will afford us a certain mode of completing the diagnosis in this, a class of uterine cases in which, above all others, the prognosis and treatment are almost entirely dependent upon the accuracy of our diagnosis.

To avail ourselves of the information afforded by the measurement of the bougie, it is to be held in view that in polypus the depth of the uterine cavity is not necessarily diminished, but sometimes the reverse, while in inversion it is always diminished to a great and notable degree.

In four cases of polypi of considerable size, projecting through the os uteri, and which I have had occasion to remove within the last three months, the bougie in all, when passed by the side of their pedicles into the interior of the uterus, showed its cavity to be of the natural depth. In some preparations, I have seen the cavity elongated, in consequence probably of its distension by the polypus previous to the protrusion of the latter. On the other hand, in partial chronic inversion of the uterus, with the fundus uteri passed downwards, and projecting through the os, the uterine cavity must be necessarily diminished on all sides in depth by this doubling up of the organ; and further, this diminution of its depth must be proportionate in its degree to the degree of the inversion, so that ultimately, if the inversion becomes, as sometimes happens, complete, the cavity will, of course, be entirely obliterated. In a common case of such partial inversion and protrusion of the fundus as is liable to be confounded with a polypus projecting through the os, the depth of the interior cavity would be found diminished at least by more than a half, or might measure on all sides about an inch or less in depth, instead of the usual length of two and a half inches.[1] In

[1] In a case in which the inverted uterus was tied in the Lyons Hospital, under the idea that it was a polypus, the patient died on the fifth day. On the post-mortem examination, the vagina and uterus were of the natural size, and the

making this measurement with the bougie, it will always be requisite to ascertain accurately that the depth of the uterus is lessened in the same way at every point around the stem of the tumour, otherwise we might mistake a polypus, which, by adhering to one side of the cavity, diminishes by the presence of its pedicle the depth of that one side merely, for an inversion of the uterus which diminishes the depth of the cavity equally on all sides. It is for this reason that we believe the employment of the finger alone, to ascertain this shortening of the uterine cavity, as recommended by Boyer[1] and Dupuytren,[2] is quite insufficient. In most cases it is too large a body to be passed without force and pain, if at all, into the contracted cervical cul-de-sac; and even if passed to its full depth, it could never leave us perfectly sure that there was not a narrow communication at some point with the uterine cavity beyond.

As a general rule, then, it will, we believe, be found that, in cases of tumours projecting through the os uteri, and when the other symptoms leave any doubt as to whether the tumour be a true polypus or merely the fundus of the organ chronically inverted, the employment of the uterine bougie will enable us to decide the diagnosis, and hence also, in a great measure, the prognosis and treatment, by the positive or negative information which it affords with regard to the shortening or non-shortening of the uterine cavity. For—

1. If the bougie passes into the uterine cavity to its usual depth of two inches and a half or more, the disease is not inversion of the fundus—a fact, the certainty of which may, while the bougie is still in utero, be farther corroborated, by the fundus in situ being actually felt through the hypogastric walls whilst it is pushed forward on the apex of the instrument, or through the rectum, whilst by the same means it is retroflected in the mode already described upon the front wall of the bowel. In this case the tumour is one which is in general safely and easily removable. But—

2. If the uterine bougie cannot pass at any point around the stem of the tumour to a greater extent than about one inch, the uterine cavity may be considered as shortened by inversion, and the protruding mass cannot be interfered with, without imminent danger

uterine cavity was on all sides reduced to *seven or eight lines in depth* (dans tous les points de son étendue sept ou huit lignes de profondeur). Petit, in whose practice the case occurred, relates that four "Maîtres de l'Art," after a careful tactile examination, all pronounced the inverted uterus in this instance to be a polypus.—*Recueil des Actes de la Société de Santé de Lyon*, 1798, p. 103.

[1] *Maladies Chirurgicales*, tom. x. p. 583. [2] *Leçons Orales*, tom. iii. p. 535.

to the patient. When in any case this last point is positively ascertained, another consideration may arise. Is the general shortening of the uterine canal the result of simple inversion of the uterus, or of inversion complicated with, and produced by, the attachment of a polypus to the interior of the fundus uteri? The decision of this point may be of the first importance, both as regards the propriety and the safety of any further interference. If the disease be simple inversion, no operation would be attempted, unless under the call of very anxious and urgent reasons. If the inversion be the result of the weight and dragging of a polypus, then, by removing the latter, the uterus may itself become replaced, and the patient be restored to the enjoyment of perfect health. In making this additional diagnosis between simple and complicated inversion, the previous history of the patient, and the characters of the tumour, may be sufficient to guide us, but both again may be liable, in particular instances, to lead us into error. The length of the whole interior of the uterus, as made up by the *double* measurement, first of the depth of the cul-de-sac of the cervix, and, secondly, of the inverted portion from the roof of this cul-de-sac to the apex of the inverted tumour, may afford us more positive information. When added together, the two measurements will, in a case of simple inversio uteri, not exceed much, if at all, the normal length of the cavity of the organ; in a case of inversion complicated with polypus, they will *exceed* this standard in a ratio proportioned to the size of the polypus and the probable elongation of the uterine tissues which it has produced.

"The *only danger*," says Dr. Gooch, "attendant on the operation on polypus is, that the ligature may include a portion of the uterus."[1] This danger, which has led to a fatal result in many master-hands,[2] will be easily avoided by the previous use of the bougie in the way we have suggested, so as to ascertain the presence or absence of any co-existent degree of inversion. If the polypus be found complicated with inversion, but yet has a sufficiently marked narrower part or pedicle connecting it with the fundus uteri, its removal in the usual way, by the ligature or knife, may be safely accomplished, if great caution be employed. If the polypus, however, adheres by a broad base, and is decidedly fibrous

[1] P. 264.

[2] See, for example, a case of Dr. Denman's, in his *Introduction to Midwifery*, p. 106, ed. of 1816. Herbiniaux, *Traité sur divers Accouchemens*, etc., tom. ii. p. 35, and Obs. xvii. etc.

or cartilaginous in its structure, the case would probably form an appropriate one for the operation that has been had recourse to in several instances of late for the removal of fibrous tumours on the wall of the uterus—namely, dividing by a longitudinal or crucial incision the thin layer of uterine tissue, covering the projecting part of the tumour, and afterwards enucleating the mass of which it consists. In this way the source of danger pointed out in the quotation from Dr. Gooch would be so far avoided.

In the preceding observations I have not adverted to the distinction between *complete* chronic inversion of the uterus, where the cavity is entirely effaced, and polypus of the neck or lips of the uterus.

ON THE USE OF THE EXPLORING NEEDLE

IN THE DIAGNOSIS OF DOUBTFUL FORMS OF PELVIC AND OTHER TUMOURS.[1]

Those authors who, some years ago, wrote at great length upon acupuncture, as Beclard, Cloquet, Carraro, etc., all spoke of the impunity with which they found that acupuncture needles could be introduced into the muscles, vessels, and even the viscera of the living body. It was well known that small punctured wounds did not bleed, and the parts punctured generally closed immediately, and left little or no trace of the separation of their tissues by the puncturing instrument, provided it were small.

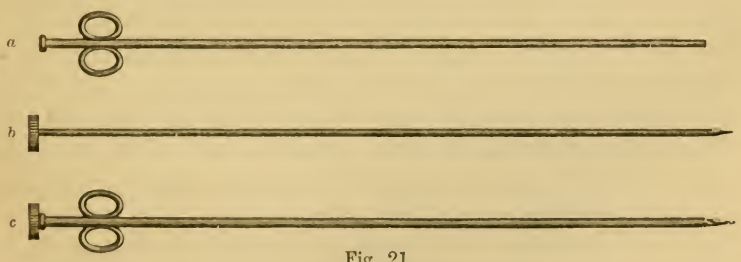

Fig. 21.

Taking advantage of the knowledge of these facts, it has been found that using a small grooved needle, or very slender trocar, we can introduce it into various morbid parts, so as to ascertain the

[1] See Proceedings of Edinburgh Obstetric Society, December 12, 1849, in *Edinburgh Monthly Journal of Medical Science*, February 1850, p. 196.

nature of their contents. Surgeons had used such exploring needles for this purpose, in cases of doubtful tumours, in order to ascertain whether they were abscesses, or cysts, or aneurisms, etc. They have been used to explore even large aneurisms without any dangerous result. Dr. Simpson alluded to a case in which a celebrated surgeon was showing to his pupils the use of the exploring needle, in detecting matter in what was supposed to be an inflamed bubo, before laying it open. Air, however, rushed out, instead of pus, showing the swelling to be formed by the skin inflamed over a hernial sac.

Dr. S. mentioned that he had repeatedly used the exploring needle to detect the nature and contents of various kinds of pelvic tumour, when no other means of diagnosis were sufficient for that purpose. He especially adverted to its advantages as a means of diagnosis in some doubtful cases of pelvic abscess and ovarian tumours, and in cases in which tumours existed about the cervix uteri, the cystic or other nature of which it was otherwise impossible to determine. Would it serve to diagnosticate cases of extra-uterine pregnancy, either by the instrument striking against bone, or by any contents that might pass through the tube?

The instrument which he employed was that figured in the accompanying woodcut. It was simply a very slender silver trocar and canula, the former tipped with a short steel point of the form of that of a graving instrument. The tube of the trocar is open for nearly an inch along one side at its point, as is seen in the cut, so as to admit more easily of the escape through the canal of the tube, of any fluid in which its point may be placed. Sometimes he had applied an exhausting syringe to the outer end of the instrument, in order to procure the flow along its tube of any more viscid fluid. *a* Shows the canula, or tube of the instrument; *b*, the trocar; and *c*, the canula, with the trocar introduced as ready for use. Thin fluids, like those of most ovarian cysts, flow readily along the tube, and can be recognised by their microscopic and other characters. When introduced into a sac containing pus, generally a few drops only of the fluid enter the tube of the instrument, from which, however, it can be readily forced, after withdrawing the instrument, by blowing through the tube. If our microscopic characters of specific tumours and morbid structures were more exact than they are at present, the pathologist might ascertain the nature of most morbid tumours that appear in the living body, by the use of such an instrument, for he could remove by it a sufficient amount of its structure or contents for histological purposes.

ON THE STATE OF ARTIFICIAL ANÆSTHESIA AS A MEANS OF FACILITATING UTERINE DIAGNOSIS.[1]

Since the first introduction of ether and chloroform into obstetric practice in 1847, Dr. Simpson stated that he had annually endeavoured to point out in his lectures the great advantages that were occasionally derivable from their employment, in the way of facilitating obstetric diagnosis. The production of a state of anæsthesia has been found specially useful as a means of physical diagnosis, under the following circumstances :—

1. In cases of difficult parturition, the state of anæsthesia enables the accoucheur to ascertain more easily and exactly, by his tactile examination, any peculiarities in the position or presentation of the child, or in the nature and amount of any impediments existing in the pelvic bones or maternal passages.

2. In instances of uterine or ovarian disease, connected with neuralgic tenderness of the abdominal walls and pelvis, it is often impossible to make a complete and useful tactile examination, unless the patient be previously anæsthetised.

3. In spurious pregnancy, with its usual characteristic, abdominal distension, the use of chloroform at once, as is now well known, enables the practitioner to decide the nature of the case; the abdominal enlargement disappearing as the state of deep anæsthesia supervenes.

4. In the two preceding morbid states, and in any other cases of uterine or ovarian disease, requiring a very accurate tactile examination, the previous production of anæsthesia not only allows the tactile examination to be gone through without suffering, but further, it very greatly facilitates the examination by the state of local and general relaxation which it induces. Under such relaxation, the physical examination of the uterine organs by touch is rendered infinitely more perfect.

5. In instances where a required examination is objected to from motives of delicacy, the state of anæsthesia saves the feelings of the patient—a matter of no slight moment in the practice of the obstetric profession.

[1] From MS. Proceedings of Edinburgh Obstetrical Society, March 14, 1855.

MEDICATED PESSARIES.[1]

In diseased states of the cervix uteri and vagina, medicinal substances have been applied locally to those parts under various forms, but principally either in a solid state, as nitrate of silver, potassa, etc., or in a liquid form, as in the great varieties of medicated injections in common use in leucorrhœa, etc. When thus used, the local application is temporary, and applied for a few minutes only. But in various forms of disease it seems an indication of no small importance to have the medicated substance applied continuously, and not temporarily. Medicated pessaries, which Dr. Simpson first introduced into practice several years ago, and which have since been extensively adopted by various practitioners in London and elsewhere (see descriptions of them published by Dr. Safford Lee,[2] Dr. Oldham,[3] etc.), enable us to fulfil this indication. By their use, for instance, we can keep the cervix uteri, when ulcerated and indurated, constantly embedded in mercurial or iodine ointment for weeks, and sometimes with the most marked benefit and success. They fulfil another indication in cases of irritation and inflammation of the mucous membrane of the cervix uteri and vagina. They keep the opposed diseased surfaces from coming in contact, and it is well known how important a matter this is in the pathology of mucous and cutaneous surfaces.

Dr. Simpson has been in the habit of applying a variety of substances in the form of medicated pessaries, particularly zinc and lead ointment, etc., as simple emollients; mercury and iodine as discutients, and particularly the iodide of lead; tannin, alum, and catechu, as astringents; opium, belladonna, etc., as anodynes. The pessaries are made of the size of walnuts, and can be easily introduced by the patients themselves; one or two in the twenty-four hours. They are composed of the medicine used mixed up in the form of an ointment, and brought to a requisite degree of consistence with one or two drachms of yellow wax to the ounce of ointment. Messrs. Duncan and Flockhart, druggists, have found the following proportions requisite in the subjoined forms, those in most frequent use in Edinburgh; and they might serve as models for the others.

[1] See Proceedings of Edinburgh Obstetric Society, March 12, 1848, in *Edinburgh Monthly Journal of Medical Science*, June 1848, p. 886.

[2] *On Tumours of the Uterus*, p. 25.

[3] *Guy's Hospital Reports*, vol. vi. pt. i. p. 193.

After being made up in the proper form, they are usually coated by the druggists with a firmer covering, by dipping them in an ointment made up with wax and resin, kept liquid by heat. About an ounce of the different ointments makes four balls.

1. *Zinc Pessaries.*—℞ Oxydi Zinci ʒj, Ceræ Albæ ʒj, Axungiæ ʒvj. Misce, et divide in pessos quatuor.

2. *Lead Pessaries.*—℞ Acet. Plumbi ʒss, Ceræ Albæ ʒiss, Axungiæ ʒvj. Misce.

3. *Mercurial Pessaries.*—℞ Unguent. Hydrarg. Fort. ʒij, Ceræ Flavæ ʒij, Axungiæ ʒss. Misce.

4. *Iodide of Lead Pessaries.*—℞ Iodidi Plumbi ϑj, Ceræ Flavæ ϑv, Axungiæ ʒvj. Misce.

5. *Tannin Pessaries.*—℞ Tanninæ ϑij, Ceræ Albæ ϑv, Axungiæ ʒvj. Misce.

6. *Alum and Catechu Pessaries.*—℞ Sulph. Aluminis ʒj, Pulv. Catechu ʒj, Ceræ Flavæ ʒi, Axungiæ ʒvss. Misce.

7. *Belladonna Pessaries.*—℞ Extr. Belladonnæ ϑij, Ceræ Flavæ ʒiss, Axungiæ ʒvi. Misce.

ON MEDICATED PESSARIES AND SUPPOSITORIES.[1]

Professor Simpson wished to bring under the notice of the Society some changes that had been made in the form and composition of medicated pessaries, and to throw out some suggestions as to the more extended employment in practice of various kinds of suppositories. He had been in the habit for many years past of applying different kinds of medicated pessaries to the cervix uteri in the treatment of uterine disorders; having been led to their use by finding that bromide and iodide of potassium, and many other substances, could thus be administered locally, which were of no avail in the form of a lotion. As a medium for the administration of drugs the ointment-pessary was not new, for Daremberg, in his late translation and commentary of Oribasius, has pointed out that a form of it was made use of long ago in Rome. Pessaries had not yet found an acknowledged place in the Pharmacopœia; but that did not interfere with their usefulness. Up to a recent date, he (Professor Simpson) had been in the habit of using pessaries composed of simple ointment, with the special drug rubbed up in it, made into a globular shape, and stiffened on the surface by being dipped in some

[1] See Proceedings of Edinburgh Obstetrical Society, February 8, 1865, in *Edinburgh Medical Journal*, May 1865, p. 1042.

warm melted ointment in which the proportion of wax largely predominated. But, latterly, Messrs. Duncan, Flockhart, and Co., of this city, had made them for him of cocceine, which presented this great advantage over the old ointment, that it was much more consistent and firm when cold, whilst it melted at a lower temperature, and with greater rapidity. In consequence of this greater solidity of the cocceine, it was found that pessaries made of that substance were more easily employed by the patients themselves than the softer and more yielding ointment-balls; and the facility of introduction was still further promoted by having them made, not spherical, but conical,—almost precisely of the shape of a Minié bullet.

Professor Simpson had brought with him specimens of some of these pessaries; but their various constitution and uses would be most easily seen by reference to the following list of them, which had been recently published by the chemical firm to which he had alluded:—

Atropine (Belladonna)	Sedative	1-20 grain.	
Opium	do.	2	grains.
Morphia	do.	½	grain.
Bismuth, Oxide	Cicatrising and Emollient	15	grains.
Borax	do. do.	15	do.
Zinc, Oxide	do. do.	15	do.
Tannin	Astringent	10	do.
Alum	do.	15	do.
Alum and Catechu	do.	15	do. of each.
Do. Iron	do.	10	do.
Acetate of Lead	do.	7½	do.
Do. do. and Opium	do.	5	do. 2 gr. Opium.
Matico	do.	10	do.
Sulphate of Iron (dried)	do.	10	do.
Gallic Acid	do.	10	do.
Perchloride of Iron	Hemostatic	5	do.
Persulphate of Iron	do.	5	do.
Sulphate of Zinc (dried)	Caustic	10	do.
Carbonate of Soda	Antacid	15	do.
Carbolate of Lime	Deodorant	5	do.
Iodide of Lead	Alterative and Resolvent	5	do.
Do. do. and Atropine	do. do.	5	do. 1-20 Atropine.
Do. Potassium	do. do.	10	do.
Bromide of Potassium	do. do.	10	do.
Mercurial	do. do.	30	do. (*Ung. Hydrarg.*)

Many of the pessaries are made with morphia (½, 1, or 2 grains) in them, to suit cases where a sedative is also required. They are also sometimes made hollow in the centre, to allow of a few drops of chloroform liniment being introduced along with them. Various other kinds of pessaries are made.

Besides being useful in the manufacture of pessaries, cocceine would be found invaluable as a medium for the administration of medicinal substances by the rectum. The ordinary suppository mass was apt to be either so soft as to be difficult of introduction through the anus, or so firm in its consistence as to be very slow of solution; and the result in some cases was, that either the medicine was imperfectly applied, or the suppository was so long of dissolving, that the drug had not the opportunity of exerting its specific action at a sufficiently early period. These drawbacks to the use of suppositories were quite done away with when they were made of cocceine, which is at once firm and fusible; and he (Prof. S.) believed that the advantages attached on its use would now probably lead to the more frequent application of medicines through this channel. We had long been in the habit of administering opiates in this way, especially the muriate of morphia in doses varying with each particular case. For many years the suppositories he had most frequently employed contained half-a-grain of morphia in each; but latterly, for ordinary uses, he had had them made with only a third of a grain, because in a few exceptional cases the half-grain exhibited by the rectum seemed to act too powerfully. Dupuytren had pointed out that sometimes opium seemed to affect patients more powerfully when administered per anum, than in the ordinary way; and this case was one of those where the individual appeared to be unusually susceptible of the influence of the dose. But besides morphia and the opiates, there was a great variety of other remedies that might be usefully applied in this way, as would be seen from this list of suppositories :—

Aloine (with Soap) . .	1 grain, 5 grains Dry Soap.
Belladonna . . .	½, 1, and 2 grains (*Ext. Bellad.*)
Bismuth, Oxide . . .	10 grains.
Borax	5 do.
Copper, Acetate of . .	2 do.
Elaterium	½ grain.
Ergot of Rye . . .	2 drops oil.
Gall and Opium . . .	5 grains and 1 grain.
Gamboge	5 do.
Henbane	5 do. (*Ext. Hyoscy.*)
Iron, Alum . . .	3 do.
Do. Persulphate . .	2 do.
Murcurial	6 do. (*Ung. Hydrary.*)
Morphia	¼, ⅓, ½, 1, 1½, and 2 grains.
Opium	2 grains.
Podophyllin . . .	1 grain.
Santonine	5 grains.

Soda, Hyposulphite of	5 grains.
Tannin	5 do.
Zinc, Oxide	10 do.
Do. Sulphate (dried)	3 do.

Thus, there were, first, a number of cathartics which might be introduced into the rectum, and thus often afford relief to patients, without their being subjected to the disagreeable ordeal of swallowing some nauseous medicine. We had all known that nurses were occasionally in the habit of introducing a bit of soap into the bowels of children, with the view of inducing a motion, and the result was thus probably due to the physical irritation that ensued. But the question was, whether we could not introduce some substance into the rectum in the form of a suppository, which would exert such an action on the mucous or muscular coats of the bowel as to lead to a full evacuation. He (Prof. S.) had employed the gamboge suppository in some instances, with a satisfactory result. When introduced into a rectum which was distended with fæcal matter, it almost always acted comfortably within an hour; but if introduced into an empty bowel it gave rise to severe griping. He had under his care a lady from Liverpool, who told him the other day, with an air of much surprise, that her bowels had acted the night before. She had been habitually constipated, and for many years had had no relief except from the use of an enema, which she used to employ in the morning; and the evening evacuation which had so astonished her resulted from the action of a gamboge suppository which had been introduced. He was not, of course, prepared to say what the precise doses of the different drugs, when thus employed, ought to be; certainly the half-grain of elaterium noted in the list was too large a dose, and in one case had produced some dysenteric symptoms. He sometimes saw, along with Dr. Maclagan, a young lady in whom half-a-grain of podophyllin in a suppository acted very easily and well; but, in some other patients, the use of a podophyllin suppository had been followed by a very prolonged diarrhœa.

Again, mercury could be administered in the suppository form in cases where it was deemed necessary to salivate, for its specific action was sometimes very rapidly developed when it was thus employed. In this form, moreover, it was one of the most effectual means at our command for the destruction of ascarides; an object which in other instances might probably be attended by the use of suppositories containing santonin or hyposulphite of soda as their active ingredients.

Besides the drugs of the aperient class, we might employ others of a more sedative or tonic character. Thus, the acetate of copper suppository had been found useful in case of bleeding piles, and he had seen a patient who was suffering from fissure of the anus, and who rebelled against the use of morphia, greatly relieved by employing suppositories containing the dried sulphate of zinc. Ergot might be administered in this manner in appropriate cases; and quinine and iron might be similarly administered,—especially with patients whose stomach resented the use of chalybeates. Astringents, too, of every variety, could be employed with the greatest benefit; and, indeed, one could hardly predicate how many kinds of medicines we may yet learn usefully to administer in the form of a simple suppository.

DIRECT LOCAL APPLICATION OF REMEDIES TO THE CAVITY OF THE UTERUS.[1]

Dr. Simpson stated to the Society that he had of late applied nitrate of silver, etc., to the lining membrane of the cavity of the uterus, in cases of uterine leucorrhœa, and of dysmenorrhœa, connected with a morbidly sensitive state of portions of the inner surface of the organ, as ascertained by the bougie, and with membranous, sub-inflammatory effusions; in chronic suppression of the menstrual discharge, etc. The results proved, that while *direct* local applications could thus be made with perfect ease and safety to the diseased lining membrane of the uterine cavity, the effects were such as to lead to the hope of a successful issue in some cases of uterine disease, otherwise almost or indeed totally unmanageable.

APPLICATION OF SOLID NITRATE OF SILVER, ETC., TO THE INTERIOR OF THE UTERUS IN MENORRHAGIA.[2]

Sir James Y. Simpson spoke of the success which sometimes attended the introduction of a solid piece of nitrate of silver into the uterine cavity, in cases of obstinate menorrhagia that were

[1] See Proceedings of Medico-Chirurgical Society of Edinburgh, April 19, 1843, in *London and Edinburgh Monthly Journal of Medical Science*, July 1843, p. 661.

[2] See Proceedings of Edinburgh Obstetrical Society, February 27, 1867, in *Edinburgh Medical Journal*, June 1867, p. 1142.

independent of the presence of polypi or of fibroid tumours in the walls of the uterus. For this purpose he had generally used a short piece of solid nitrate of silver, made half the thickness of the usual stick, and introduced and lodged in the uterine cavity by a hollowed or tubular instrument, of the size of the common uterine sound. In some cases the hemorrhage was arrested by this treatment, as it is in internal rectal hemorrhoids by the application of slight caustics. The powder of the persulphate of iron may be lodged in the uterus for the same purpose. He considered solid substances and powders as much more safe applications to the interior of the uterus than any forms of fluid injections. The occasional danger arising from the latter was not, he believed, so much from their passing along the Fallopian tubes into the peritoneal cavity, as from their sometimes over-distending the uterus, and fissuring and tearing through its mucous surface, thus getting fatal access to the circulation.

GALLIC ACID IN MENORRHAGIA.[1]

Professor Simpson stated that for the last year he had employed gallic acid in some cases of menorrhagia, with the most successful results. Like all the other remedies directed against that disease, it had also occasionally failed in his hands. Some of the cases, which had completely yielded under its use, were of an old standing and aggravated description. He gave it during the intervals, as well as during the discharge, in doses of from ten to twenty grains per day made into pills. It had this advantage over most other anti-hemorrhagic medicines, that it had no constipating effect upon the bowels. He was first induced to use it, by finding a case of very obstinate menorrhagia get well under the use of Ruspini's styptic, after many other remedies had utterly failed, and from it being alleged that gallic acid was the active ingredient in that styptic. He suggested whether the anti-hemorrhagic properties of some of our common astringent drugs may not depend upon the gallic acid as much or more than upon the tannin which they contain, or upon the tannin becoming changed into gallic acid within the body.

At a subsequent meeting of the Society, February 7, 1855, Dr.

[1] See Proceedings of Medico-Chirurgical Society of Edinburgh, April 19, 1843, and February 7, 1855, in *London and Edinburgh Monthly Journal of Medical Science*, July 1843, p. 661 ; and *Association Medical Journal*, February 1855, p. 186.

Simpson stated, as the result of his experience in cases of hemorrhage, that gallic acid was only occasionally successful. Some ten or twelve years ago he had had occasion to treat a case of severe menorrhagia where all kinds of medicines had been used without effect. From the recommendation given by Sir Benjamin Brodie in his chapter on *Hæmaturia*, he prescribed Ruspini's styptic; and relief speedily followed. The disease recurred, however, and the patent medicine was found to be too expensive. Acting on the hint of Dr. Anthony Todd Thomson, that Ruspini's styptic contained it, he gave gallic acid, and similar benefit was obtained. Dr. Gairdner said that tannin had greater effect as an astringent in the treatment of hemoptysis; but this it was difficult to reconcile with the observation of Wöhler, that tannin was converted into gallic acid in its passage through the circulation, and consequently before it reached the lungs. He believed in fact that rhatany, krameria, and other vegetable astringents containing tannin, acted as secondary hemostatics upon the lungs, kidneys, and uterus, by being carried in the blood of these parts as gallic acid; and that their efficacy in restraining hemorrhage was thus to be explained. Dr. Andrew Wood had stated his experience of the efficacy of the acid in purpura; while it was well known that Garrod had as strongly recommended alkalies in that disease. Such statements he thought could be reconciled by supposing that there might be several forms of purpura, each with their stronger affinity to particular remedies; and he believed that the uncertainty in the treatment of menorrhagia admitted of a similar explanation. After such astringents were given by the stomach, just as after gallic acid, gallic acid, as stated by Liebig, was found in the urine; and consequently was present in the blood.

IMPERFECT DEVELOPMENT OF THE UTERUS, GIVING RISE TO AMENORRHŒA, ETC.[1]

Dr. Simpson mentioned that he had seen a considerable number of cases of short or imperfectly developed uteri in the living subject. The imperfect development of the organ was ascertained, on examination by the finger, by the small and atrophied cervix uteri, and by actual admeasurement of the length of the cavity by the uterine

[1] See Proceedings of Edinburgh Obstetrical Society, Session xii. in *Edinburgh Monthly Journal of Medical Science*, September 1854, p. 275.

sound. Instead of being 2½ inches in length, the cavity in such cases was only 2 inches, or more frequently only 1½ or 1 inch long. The subjects of this imperfect development were often well made and formed in other respects. But the malformation led to various functional defects, especially amenorrhœa and sterility. The amenorrhœa was usually persistent, and when a patient applied for medical relief who was already twenty-five or thirty years of age, this malformation would in a large proportion of cases be found to be the organic cause. In some such cases of amenorrhœa, there was great vascularity of the face, and occasionally a most unconquerable form of acne. He had seen in some of these instances the wearing of an intra-uterine galvanic, or zinc and copper, pessary —gradually increased in size—followed by the best results, and even occasionally by cure of the amenorrhœa. The uterus developed itself around such a foreign body, when it filled its cavity, as it did around a fibrous tumour or an ovum.[1]

ON THE NATURE OF THE MEMBRANE OCCASIONALLY EXPELLED IN DYSMENORRHŒA.[2]

It is well known that in some cases of dysmenorrhœa an organised membrane is expelled, with much pain, from the uterus during the course of the catamenial discharge, and that this happens either occasionally only, or, what is far more common, during a long succession of menstrual periods.

All authors who have expressed an opinion regarding the nature of this dysmenorrhœal membrane have, so far as I am aware, regarded it as a morbid structure formed by the exudation of coagulable lymph or fibrin upon the free surface of the mucous membrane of the uterus.

"It is composed," says Dr. Churchill, "of plastic lymph, such as we see secreted by the mucous membrane of the trachea in croup, thrown off by the lining membrane of the uterus, and taking generally the form of the cavity of that organ, although it may be discharged in shreds."[3]

"We shall probably be correct," Dr. Montgomery observes, "in referring such productions [dysmenorrhœal membranes] to any cause capable of exciting a certain degree of irritation, or perhaps

[1] See pages 601 and 650.

[2] See *Edinburgh Monthly Journal of Medical Science*, September 1846, p. 161.

[3] *Diseases of Females*, p. 102; edition of 1844.

of inflammation, by which fibrin is poured out on the internal surface of the cavity of the uterus, and assumes a membranous texture, as we find occurring in other hollow organs lined with a mucous membrane, as, for instance, in the intestines in cases of diarrhœa tubularis, and in the trachea and air-tubes."[1]

"The membranous shreds passed in some of these cases [of dysmenorrhœa] evidently," remarks Dr. Copland, "consist of plastic lymph thrown out in the cavity of the womb. . . . That a degree of inflammatory irritation exists in the internal surface of the uterus, even in the neuralgic form of the disease, is proved by the formation and expulsion of a false membrane in many cases of that form. That this membrane is induced by the similar state of inflammatory action to that which sometimes occurs in other mucous surfaces, and gives rise to a similar exudation, is most probable, notwithstanding the absence of other inflammatory phenomena and the neuralgic character of the pain."[2]

In a number of cases, I have had an opportunity of examining from time to time the form and structure of these dysmenorrhœal membranes. Two or three years ago, my observations upon them led me to believe that they were not new or false membranes formed of coagulable lymph, and secreted by the mucous surface of the uterus, but that they in reality consisted of the superficial layer of the mucous membrane of the uterus itself, hypertrophied and separated. All my later observations have gone to confirm me in the same opinion—viz. that the productions in question are not the results, as is generally supposed, of fibrinous or plastic *exudations upon* the free surface of the mucous membrane of the uterus, but that they consist of actual *exfoliations* of that membrane itself.

The proof of this opinion rests upon different grounds:—

First, The dysmenorrhœal membrane presents anatomical peculiarities that are never seen in any simple fibrinous or inflammatory exudation; and these anatomical peculiarities, on the other hand, specially pertain to, and are characteristic of, the structure of some mucous tissues, such as that of the uterus. One special illustration

[1] *Signs of Pregnancy*, p. 147.

[2] *Dictionary of Practical Medicine*, vol. ii. pp. 844, 845. See also Dr. Fergusson in the *Library of Medicine*, vol. iv. p. 311: "A not uncommon effect of dysmenorrhœa is the formation of *coagulable lymph* modelled to the shape of the inner surface of the uterus." Dr. Rigby's *Essay on Dysmenorrhœa*, p. 39: "*Fibrinous exudations* every now and then attend these cases of dysmenorrhœa." Dr. Ashwell's *Treatise on Female Diseases*, pp. 105 and 107, etc.

may suffice. Professor Reid, Krauss, and others, have shown that the surface of the mucous membrane of the uterus is marked by numerous orifices of small tubular glands, crypts, or follicles, opening upon it (the uterine glands of some modern authors). This structure I have distinctly traced in different specimens of dysmenorrhœal membrane from different individuals.

Secondly, The general configuration and character of the surfaces of the dysmenorrhœal membrane are such as would result from the origin which I have attributed to it—namely, the exfoliation or detachment of the mucous membrane of the uterus. In those instances in which the membrane is thrown off in one piece, and without disintegration, it presents exactly the flattened triangular appearance of the uterine cavity. Its sides may be so compressed that the expelled mass at first appears solid; but a little careful dissection or maceration will readily show that it consists of two layers, and that there are the remains of a cavity between them. The interior of the cavity is smooth, and marked by the orifices of the uterine mucous crypts that I have above alluded to. Occasionally we can easily trace three large openings at its three angles, corresponding to the openings of the two Fallopian tubes and cervix uteri. But the external surface of the mass is rough and shaggy, marking the effects of dilaceration from the tissue of the uterus. Sometimes we see a piece discharged quite smooth on one surface, and rough on the other. When this is the case, we may be perfectly certain that it is a portion only of the membrane which has been expelled, or, at least, preserved for inspection. For, if the portion of mucous membrane lining the anterior wall of the uterus alone, or lining its posterior wall alone, be discharged and examined, and not that of the whole cavity, it will necessarily display the apparent anomaly alluded to. If the membrane is thrown off in broken or disintegrated fragments, as sometimes happens, it will be more difficult to trace the structural characteristics that I have mentioned. Another form of difficulty is occasionally produced by blood being infiltrated into or upon the dysmenorrhœal membrane. In some instances the membrane is found encased in one or more layers of coagulated blood; and if that blood has already become decolorised, and assumed a fibrinous appearance, mistakes might easily occur, provided the inquirer were not aware of this source of fallacy.

One of the earliest descriptions of the dysmenorrhœal membrane upon record is given by Morgagni. He gives an exact account of the appearances which it presented in the case of a "noble matron,"

long afflicted at the menstrual period with "pains like those of child-birth." Morgagni's description of the dysmenorrhœal membrane expelled on these occasions is so exact and excellent, that I shall perhaps be excused quoting it. "In almost the middle," as he states, "of the membranous flux, a membranous body, as it appeared, was discharged from the uterus; and that in such a form, and of such a magnitude, as perfectly corresponded to the triangular form of the uterus; being moderately convex externally; on which surface it was unequal and not without many filaments that seemed to have been broken off from the parts to which they had adhered, but internally hollow; on which surface it was smooth and moist, as if from an aqueous humour, which it had before contained, but had discharged, at its own exit, by an ample opening, which was at one of its angles, that had been readily opened by rupture."[1]

Thirdly, The dysmenorrhœal membrane exactly resembles the decidual membrane, the *decidua vera;* and all our highest authorities in anatomy are, I believe, now willing to grant that, as pointed out by the researches of Sharpey, Weber, Goodsir, and others, the decidua vera is not a new membrane formed in the uterus after conception, but merely the normal mucous membrane of the uterus, hypertrophied, with its mucous crypts or follicles increased in size, and the cells of its interstitial tissue greatly developed and multiplied. In the dysmenorrhœal membrane the mucous follicles or crypts are perhaps not enlarged and developed to the same proportionate degree as they are in the decidual membrane. In other respects the two membranes are identical. They have the same triangular form. There is the same appearance in both, of openings at their three angles, and in both, these openings are occasionally more or less perfectly sealed up when the tissue of the membrane, in their immediate neighbourhood, is developed in an unusual degree. The external surface of each membrane has the same shaggy, ragged form. In each we have the same cribriform appearance upon their smooth internal surface, marking the orifices of the mucous follicles. When examined under the microscope, the interstitial or interfollicular tissue of both membranes shows a similar structure, namely, one wholly composed of an agglomeration or superposition of simple nucleated cells. And altogether, if, on the one hand, it be allowed that the structure of the decidua proves it to be the mucous membrane of the uterus in a state of high development and hypertrophy, then, on the other hand, the structure

[1] Morgagni, *The Seats and Causes of Diseases*, etc., vol. ii. p. 706.

of the dysmenorrhœal membrane is so similar to that of the decidua, as to prove a perfect identity with the decidua in its characters, and, consequently, also in its origin.

In some respects the evidence which we have in favour of the decidual membrane being merely a hypertrophied state of the mucous membrane of the uterus, is still wanting, in so far as regards the dysmenorrhœal membrane. For, *first*, in cases of patients dying at different periods of early pregnancy, a regular progression of observations has now been made, showing the gradual transformation of the true mucous into the true decidual membrane; and, *secondly*, in patients dying after delivery, and, consequently, after the separation of the decidual or lining membrane of the uterus, the actual absence of the mucous surface of the uterus has been often ascertained on dissection. I lately saw a case where the patient died six weeks after delivery, and still, at that late date after confinement, the mucous lining of the uterus was not yet regenerated. No corresponding series of observations has hitherto been made upon the actual formation of the dysmenorrhœal membrane before menstruation, or upon its actual absence after that period. But a more careful investigation of the state of the uterus after death, in patients who have happened to be suffering under membranous dysmenorrhœa during life, will, I have no doubt, afford the requisite data. It may not be uninteresting to add, that the absence of the mucous lining of the uterus in persons who have died after delivery, or who have been previously subject to membranous dysmenorrhœa, may have given rise to the strong opinions expressed in former times by several anatomists, and particularly by Morgagni, Chaussier, and Gordon, in regard to the human uterus not being normally provided with a mucous membrane. Not meeting with that membrane under some circumstances and in some cases, they were induced to doubt its presence under any circumstances or in any cases.

Modern physiology has made us sufficiently acquainted with the curious fact, that a portion of the epithelial layer of the mucous surface of various organs exfoliates constantly and normally during the performance of the special functions of these organs. For instance, this holds true with regard to the epithelium of the stomach during digestion, and that of the uterus during menstruation. But there are few circumstances, either in healthy or morbid anatomy, so strange as that which I have attempted to prove in the preceding remarks—namely, that the proper mucous tissue of the uterus

itself may, within the compass of a menstrual period, form, enlarge, separate, and again be reproduced; and further, that all this may occur and continue regularly for a succession of months, or, as sometimes happens, for a succession of years.

I have no intention, however, at present of dwelling either upon the various pathological or practical views to which the opinion that I have above propounded, regarding the origin and nature of the dysmenorrhœal membrane, very evidently points. It is enough, perhaps, to remark, that the observations which I have made go to demonstrate that the dysmenorrhœal membrane is not formed, as is generally believed, by a simply inflammatory effusion of plastic or coagulable lymph, and hence is not to be successfully prevented and combated by simple anti-inflammatory treatment. The action giving rise to it may in some cases be combined or complicated with inflammation. I have seen, for example, the membranous dysmenorrhœa in several instances co-existing with inflammatory induration and ulceration of the cervix uteri. But essentially, the normal action of the uterus or ovaries giving rise to the formation of the dysmenorrhœal membrane is not a state identical with inflammation, but a state identical with the condition of these organs after impregnation and during the earlier weeks of pregnancy. It is so far a state and product natural to one special condition of the uterus, but here occurring at an unnatural time, under unnatural circumstances, and with unnatural frequency.

DILATATION AND INCISION OF THE CERVIX UTERI IN CASES OF OBSTRUCTIVE DYSMENORRHŒA.

Dr. Simpson, in speaking of dilatation of the os and cervix uteri as a means of treatment,[1] pointed out the results of this practice in the hands of the late Dr. Mackintosh in the cure of dysmenorrhœa and sterility, connected with normal and inflammatory strictures of the os uteri. His own results had not been so successful as those of Dr. Mackintosh; but he had now seen a considerable number of severe cases in which dysmenorrhœa that had previously resisted all other kinds of treatment, had at once yielded to the mechanical dilatation. Dr. Simpson had found the stricture occasionally at the

[1] See Proceedings of Medico-Chirurgical Society of Edinburgh, July 3, 1844, in *London and Edinburgh Monthly Journal of Medical Science*, August 1844, p. 734.

os internum, or opening between the cavities of the cervix and body, and not at the os tincæ. Dr. Mackintosh had effected the dilatation by long straight bougies of different sizes. Dr. Simpson had found them more easily used when slightly curved. He also showed other instruments, one of them like the dilator for the female urethra, which he had occasionally employed for this purpose. These instruments were all of them intended to be left in the os uteri for only a short period, and their introduction repeated from time to time, as in the usual treatment of stricture of the urethra in the male. Latterly Dr. Simpson had in his practice thrown these aside, and used another, a form of permanent bougie, for this purpose, which he considered to be greatly preferable. These permanent bougies (Fig. 25, p. 701) were made of Berlin silver; the stem or part included in the uterine cavity was two inches and a quarter in length, the lower end which rested in the vagina was bulbed and enlarged to the size of a large almond, and was perforated below for the purpose of being placed on a temporary handle, used in the introduction. One of the instruments was left in the uterine cavity for three or four days, and by that time the part was so much relaxed, that another of a much larger size could, in general, be readily introduced. They could easily be borne without the slightest inconvenience, and, indeed, without the patient being aware of their presence. Dr. Simpson pointed out that this permanent form of bougie gave altogether much less pain to the patient and less trouble to the practitioner; was more certain and expeditious in its effects, and was especially useful when the surrounding tissues of the lips and cervix were in any degree indurated. Obstructive dysmenorrhœa sometimes depends on other circumstances than ordinary strictures of the os. It is sometimes seen in connection with the conical hypertrophy and elongation of the cervix. He had found it in several instances accompanied with much morbid thickening of the anterior lip of the os uteri, the posterior lip being thin and healthy, and the os stretched out between them of an irregular crescentic shape. In such, and other instances, he had divided the os uteri on each side to the extent of a few lines with a very narrow knife or "*lithotome caché*," and subsequently kept the part temporarily dilated by the sponge-tent. He quoted cases of the perfect success of this simple and safe measure; it placed the parts in somewhat the same condition as that which they present subsequent to miscarriage; and this latter occurrence is known in general to leave without dysmenorrhœa those who have previously been

labouring under that affection, whilst, at the same time, women after aborting usually soon again become pregnant, there being no such great lacteal determination to the mammæ as occurs after parturition at the full period, and which seems then usually to interfere with the early repetition of conception.

At a meeting of the Edinburgh Obstetric Society, March 10, 1847,[1] Dr. Simpson stated that he had now been in the habit for three or four years past of performing the operation of incision of the cervix uteri for obstructive dysmenorrhœa. He first described the operation to the Medico-Chirurgical Society in 1844, and it had latterly been adopted by Dr. Rigby, Dr. Protheroe Smith, Dr. Oldham, and other accoucheurs in London and elsewhere. He had frequently been asked if he had occasion to perform the operation often. Certainly he had. In the last week he had operated in seven cases. He was in the first instance led to incise, instead of dilating the os uteri with bougies, by meeting several years ago with a patient suffering from dysmenorrhœa, who could only remain a few days under his charge. The incisions had in this instance the desired effect; and the lady was delivered of a son within a twelvemonth. She had been previously six or seven years married, but had never been pregnant.

He further explained that he believed the sufferings in obstructive dysmenorrhœa to arise from the uterus being driven into contractions, like those of abortion, to expel its own *retained* menstrual secretions. Now, the menstrual secretion need not *necessarily* be retained when the os uteri is small; for the secretion might form very slowly, and so escape without accumulation and distension. On the other hand, it might be secreted so abundantly by the lining membrane of the uterus, as not to escape sufficiently freely even when the os was of the natural size, and thus, under that condition, lead to retention, accumulation, and expulsive pains. In fact, in order to produce obstructive dysmenorrhœa, there must be a want of relation between the quantity of fluid secreted, and the quantity allowed to escape, so that a greater or less degree of retention is the result. It was of course most apt to occur with a small and contracted os uteri, and these were the cases most frequently requiring the operation.

The instrument which he makes use of is a kind of lithotome

[1] See Proceedings of the Society in *Edinburgh Monthly Journal of Medical Science*, May 1847, p. 870.

caché, manufactured by Mr. Young, cutler. The end of the instrument is passed up through the cavity of the cervix, and within the os internum. It is then slightly opened laterally, first on one side and then on the other, so as to divide any fibres that may be causing constriction of the internal orifice. The principal incision is then made in withdrawing the instrument. This incision commences at the union of the cervix with the body of the uterus, and passing gradually more and more into the substance of the cervix as it descends, the blade is brought out at the outer and lower edge of the cervix, at the point of reflection of the mucous membrane upon the wall of the vagina. The instrument is then turned, and a

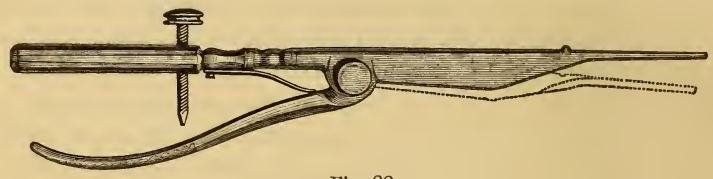

Fig. 22.

similar cut made on the other side; or the incisions may be made antero-posteriorly instead of laterally. The incision is thus of a conical form, and at its lower part includes the whole thickness of the cervix. Care must be taken that it does not pass beyond the substance of the cervix, as it is closely surrounded by a plexus of veins, which, if cut, would certainly cause severe hemorrhage. If care be taken to regulate the incision in this way, the hemorrhage is usually very trifling. The operation causes little or no pain. The lips of the wound generally get everted, and have very little tendency to cohere. If they offer to do so, it is necessary to touch the raw surface, more especially the angles of the wound, every three or four days, with nitrate of silver.

[In consequence of the gratifying results sometimes produced by incision of the cervix uteri in obstructive dysmenorrhœa and sterility, that operation became an extremely favourite one with Simpson. Certain risks connected with it, however—and in particular its liability to be followed by pelvic inflammation—inclined him ultimately to a rigorous selection of cases, and to the enjoining of recumbency for several days after the performance of the operation.—J. W. B.]

ON RETROVERSION OF THE UNIMPREGNATED UTERUS.

PRELIMINARY REMARKS AND DEFINITION.

Diseases are sometimes regarded as rare, merely in consequence of a deficiency on our part of a proper and easy means of detecting them during life, or from our overlooking their existence in the dead body. Not many years ago, for instance, emphysema of the lung and granular degeneration of the kidney were supposed to be affections that were very seldom met with in practice. After, however, Laennec and Bright pointed out simple and ready modes of diagnosticating these diseases, they were speedily found to be morbid affections that were extremely common instead of extremely rare in their occurrence; and every physician at the present day is now ready to acknowledge their great frequency.

With some of the displacements of the unimpregnated uterus practitioners have long been familiar. In particular, the displacements of the organ downwards, in the form of prolapsus and procidentia, are recognised and acknowledged by all, and elaborately described in every work on female diseases. But displacements of the unimpregnated uterus, in the form of versions or flexions, either of the whole or of the upper part of the uterus, posteriorly, anteriorly, or laterally, have hitherto been looked upon as rare; and this, far more however from our past want of power of diagnosticating them, than from their own infrequency.

In the present communication, it is my object to describe briefly some new and simple means that I have practised for the last four or five years for detecting and treating these displacements.

Let me premise that, in the normal and healthy state, the long axis of the uterus is situated in a line parallel with the line of the axis of the brim of the pelvis, or in the relative direction represented in the accompanying diagram (Fig. 23, *b*.) But the fundus of the uterus, instead of looking upwards, may be turned downwards and forwards, or downwards and backwards. In *c* it is represented as directed downwards and forwards, constituting *anteversion*. In *a*, *d*, *e*, it is directed downwards and backwards, constituting *retroversion*. These three figures of retroversion represent different forms or degrees of this displacement. The diagram, *a*, represents an aggravated degree of retroversion, taken

[1] See *Dublin Quarterly Journal of Medical Science*, May 1848, p. 371.

from a drawing of a case of this displacement by Frank. The mode in which the rectum is impressed by the retroverted uterus is here shown. He found this instance of displacement in the body of a patient who had died of chest disease, but he does not give her previous history.[1]

Some authors have attempted to draw a specific line of distinction between the forms of posterior displacement of the uterus portrayed in *d* and *e*, and have described the form given in *e* as

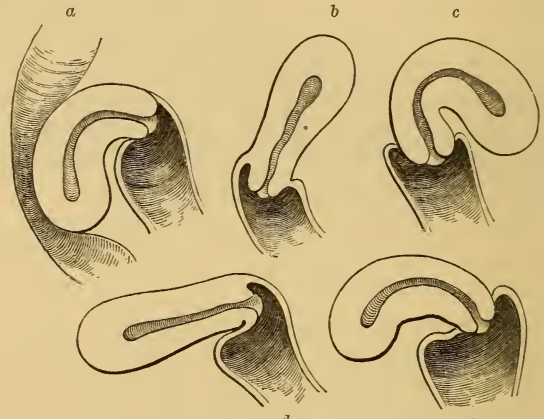

Fig. 23.

retroflexion, and that given in *d* as *retroversion*. In other words, by retroversion, properly so called, they would understand a displacement backwards of the entire organ, *d*—the flexion taking place in the upper part of the vagina, and the uterus itself not being necessarily changed in form. On the other hand, retroflexion, *e*, is a term proposed to designate the displacement backwards of the fundus only, along with more or less of the body of the uterus; the lower part of the cervix uteri retaining, in some degree, its natural position, and the flexion taking place in the substance of the body, or upper part of the cervix of the organ. But, in reality, in the living subject, we meet with all possible intermediate shades and degrees of these posterior displacements; and I believe it to be an incorrect and unnecessary refinement to draw such theoretical nosological dis-

Fig. 23. These diagrams are intended to represent vertical or antero-posterior sections of the uterus, and upper part of the vagina. In *b* the uterus is supposed to be placed in its normal position, and the other four figures represent different deviations of the organ from this position.

[1] Opuscula posthuma, p. 78.

tinctions between them. Practically and pathologically there is no true difference between these modifications or degrees of this morbid position of the uterus; and I shall in my subsequent remarks include them, and all other varieties of posterior displacement, under the generic term of Retroversion. Farther, in order to avoid repetition, I shall in the present communication treat only of retroversion of the uterus. It will be found that the same principles of diagnosis and treatment apply, *mutatis mutandis*, to the almost equally common displacement of the uterus which I have defined above as Anteversion.

ALLEGED RARITY OF RETROVERSION OF THE UNIMPREGNATED UTERUS.

In all our English systematic books on midwifery and female diseases, down to the very latest works, retroversion of the *unimpregnated* uterus is described as an exceedingly rare disease.

In his work on the Diseases peculiar to Women (1846), Dr. Ashwell tells us that he has "been long in the habit of observing uterine organic disease;" but he states "the published cases of retroversion are nearly silent on any other cause than pregnancy;" and he speaks of this as the result also of his own observations.[1]

Dr. Burns (1844) says: "Mr. Pearson relates a case where the uterus was retroverted in consequence of being scirrhous. Dr. Marcet gives an instance where the uterus was retroverted without pregnancy, producing constipation and vomiting. Dr. Alken of Bergheim relates a case where a woman, after suffering from difficulty of passing the urine and stools, had in fourteen days complete retention of both. The bladder reached to the umbilicus; the extremities were cold, the pulse small, vomiting, etc.: the urine was drawn off. After bleeding and the warm bath, force was employed in opposite directions, both from the rectum and vagina, and in an hour the uterus was replaced. It was, however, displaced again next day, but was reduced, and the retroversion did not return. The uterus was unimpregnated." Dr. Burns himself quotes these cases in illustration of his own opinion, that retroversion, besides occurring during pregnancy, "*may* also be produced when the womb is *enlarged* to a certain degree by disease."[2]

Writing in 1844, Dr. Churchill observes: "I have known retro-

[1] *Practical Treatise on the Diseases peculiar to Women*, p. 598.
[2] *Principles of Midwifery*, p. 288.

version to happen the first day of a menstrual period, when the weight of the uterus was increased by afflux of blood. Mr. Pearson and Dr. Blundell met with cases of retroversion caused by scirrhus. Callisen and Blundell mention cases where this accident followed delivery, *but such must be exceedingly rare.*"[1]

The experience of the few last years has amply convinced me that these opinions regarding the supposed rarity of retroversion of the unimpregnated uterus are entirely wrong. Since discovering an easy method of detecting its existence, I have found it one of the most common and frequent displacements and affections of the unimpregnated uterus.[2] My observations, in this respect, have been fully confirmed by several of my professional brethren in Edinburgh. Three or four years ago I pointed out its frequency, mode of diagnosis, and treatment, to my friends, Drs. Rigby and Protheroe Smith, of London; and I have much pleasure in adding, that their extensive opportunities at the London Hospital for Uterine Diseases have enabled them and the pupils of that useful institution to confirm amply the justness of my previous deductions, with regard to the great frequency of retroversion, and the advantages of my proposed methods of detecting and treating it.

SYMPTOMS AND DIAGNOSIS OF RETROVERSION.

General Remarks.—The morbid conditions of the uterus are recognised in practice by two classes of symptoms—viz. the *functional and physical.* The evidence derived from these two different classes is different in its nature and value.

All accoucheurs will, I believe, readily admit that the two following observations hold good with regard to the symptoms and diagnosis of utero-gestation—viz. 1. That the state of the uterus in pregnancy, one and identical as it is, is liable to be accompanied, in different women, or in the same woman in different pregnancies, with very different local, sympathetic, and general effects or functional symptoms; and, 2. That the usual concourse and succession of functional phenomena, to which pregnancy generally gives rise, may be induced by other states and irritations of the organ than utero-gestation.

[1] *On the Principal Diseases of Females*, p. 267.

[2] In April 1843, I stated these results in a communication to the Medico-Chirurgical Society of Edinburgh; showed the frequency of retroversion of the unimpregnated uterus, and its means of detection and cure. See *Monthly Journal of Medical Science* for July 1843, p. 660.

The same two important inferences are true in regard to the various individual morbid affections of the uterus. The marked uncertainty which exists respecting the local and constitutional effects produced by the condition of the organ in *pregnancy*, holds equally good regarding the effects produced by it in its different states of actual *disease*. In uterine disease, as in pregnancy, the same specific affection of the organ excites sometimes very different phenomena in different cases; and the same specific phenomena frequently result from affections of the organ that are entirely at variance with each other in their pathological character, in their course, and in the treatment required.

In deciding upon the existence or non-existence of pregnancy, especially in any case of importance or doubt, no medical man who valued his own professional character would deem himself justified in offering a final and decisive opinion from the study of the mere functional symptoms only; nor would he venture to form a definite judgment, until he had made a sufficiently accurate local or *physical* examination of the state of the uterus itself. In deciding, in the same way, upon the pathological nature, and consequently upon the line of treatment which any marked uterine disease may require, we believe exactly the same caution to be necessary, and the same local or physical examination to be demanded, where there exists any doubt, and where the examination is not otherwise counter-indicated. It is assuredly only by doing so that we can hope, with any certainty, to decide upon the *specific* nature of the uterine disease that may be present. We may make the general diagnosis of the existence of uterine disease by the consideration of the *functional* derangements to which such diseases give rise. We can only make the differential diagnosis of what the specific disease of the uterus really is, by aiding this by the physical examination of the structural condition of the organ itself. The study of the rational or functional symptoms may show that the organ is affected, without showing us how it is affected. They point out the fact of the uterus being the seat of some diseased state or action, without pointing out what is the specific nature of that diseased state or action. To gain this last most important information, we must have recourse to the study of the physical signs or symptoms of uterine disease, in addition to the functional. In other words, we must attempt to ascertain the actual, physical, or structural condition of the uterus by the tactile and visual examination of the affected organ itself. We must endeavour to decipher and read its morbid anatomy in the living body,

by the careful employment of the senses of touch and sight. Hence, then, I attach far less importance to the functional symptoms of retroversion which I have first to enumerate, than to the physical signs, which I shall afterwards consider.

FUNCTIONAL SYMPTOMS OR DERANGEMENTS.

In some cases of retroversion of the unimpregnated uterus, more especially when the displacement is chronic and the pelvis large, as in some other forms of serious uterine disease and of pregnancy, few or no marked functional or sympathetic symptoms, either local or general, are present; while in other instances the attendant functional derangements and irritations are excessively severe and distressing. And in this, as in other uterine affections, between these two extremes we may meet with every shade of difference.

In retroversion, as in other morbid conditions and diseases of the unimpregnated uterus, the accompanying sympathetic derangements or symptoms are, when they are well and highly marked, more or less perfect imitations of the secondary phenomena of pregnancy. Dyspeptic and hysterical symptoms are sometimes present, with local neuralgic pains in the mammæ; in some portions of the vertebral column; or, what is still more frequent, in the parietes of the abdomen or chest, and more especially in a limited spot beneath the left mamma. The displaced position of the uterus often gives rise to mechanical irritations and symptoms of the same kind as if the organ were actually morbidly enlarged. Constipation and impeded defecation are frequent results, partly from the fundus of the displaced uterus physically compressing the calibre of the rectum, and partly from its producing a functional inability to expel the feculent contents of the bowel through the lowest part of the canal. Occasionally the bowel is irritated, and there are discharged from it, from time to time, quantities of mucous or fibrinous-like effusions. The bladder frequently suffers from dysuria or retention; and, much more rarely, I have seen a degree of incontinence, especially where the urine has become phosphatic, from the want of power in some cases of completely emptying the bladder. Symptoms of weight, tension, and bearing down in the regions of the uterus and rectum, with dragging at the loins and in the regions of the uterine ligaments, are very common. Pains often stretch down one or both of the lower extremities. Occasionally there is an inability to bear carriage exercise, and walking and standing speedily produce fatigue.

In a few rare cases I have known the patients to find themselves forced to remain almost constantly in the horizontal position, from the intense and overpowering feeling of pressure and malaise which the erect posture always brought on, and the power of standing and progression restored by the spontaneous or artificial reposition of the uterus. In general, all the symptoms, local and constitutional, which I have alluded to, are aggravated more or less by exercise in the erect position; and they are more particularly liable to be increased in their intensity when the uterus becomes periodically congested and heavier, at the recurrence of each menstrual period.

In some cases of retroversion the menstrual function is not morbidly altered. In other cases, however, I have seen the catamenial discharge affected, but affected most oppositely and variously —occasionally in the way of amenorrhœa, sometimes of dysmenorrhœa, and not unfrequently of menorrhagia, particularly after miscarriage.

The mucous secretion of the uterus is not altered by retroversion, unless congestion or inflammation supervene; it may then change into leucorrhœa. Occasionally there is a sudden temporary increase of discharge, once or oftener during the intervals between the catamenial periods, as if it had collected in the cavity of the retroverted organ, and escaped, or become expelled, only from time to time.

When a patient with a retroverted uterus becomes pregnant, abortion is apt to take place. But I have seen various instances in which the uterus became spontaneously rectified in position as it became larger, and utero-gestation went on to the full time. Usually the existence of retroversion interferes with the function of conception. Often it is a cause of sterility, as shown by impregnation taking place after the displacement is rectified. In women who have borne children at distances of several years between each, I have several times found the uterus permanently retroverted in the unimpregnated state.

The functional symptoms that I have enumerated may make us suspect the existence of retroversion of the uterus. But retroversion may be present without most, or almost any of them; and they may be present with other diseases besides retroversion. Hence the necessity here, as elsewhere—in this, as in other uterine affections—of having recourse to the physical examination of the uterus, in order to decide and determine its actual morbid state.

PHYSICAL SIGNS OF RETROVERSION.

The usual physical means of diagnosis of uterine disease are reducible to the observation of phenomena by the senses of sight and touch.

Speculum.—The employment of sight, by means of the speculum, assists us in no respect in the diagnosis of retroversion.

Tactile Examination.—On an accurate vaginal examination we feel an apparent projection of a solid tumour between the uterus and rectum, when applying our finger, or fingers, behind the cervix uteri to the *posterior* part of the upper reflection, or roof of the vagina. (At *a*, Fig. 23.) The same firm mass is felt through the anterior wall of the bowel in making an anal examination. The tumour or mass feels smooth and roundish on its surface; is often sensitive on pressure, more especially if the retroversion is recent, or when the posterior wall is, as often happens, congested and engorged; is generally capable of being moved more or less easily by the finger; and varies in size according to the degree of displacement, and the morbid or healthy state of the uterine walls.

The os and cervix uteri may be displaced forwards, or they may maintain their usual position. The whole body of the uterus is often prolapsed and lower than its natural situation; but occasionally it is quite normal in these respects.

How are we to determine that the solid tumour lying upon the back part of the roof of the vagina, and between the rectum and uterus, is the displaced fundus and body of the uterus.

If the patient be unusually thin and emaciated, and we examine simultaneously with one or two fingers of the right hand placed in the vagina, and those of the left hand placed above the pubes, we can almost feel the uterus between the two hands, and ascertain the whole position and relations of the organ; but this, however, can very rarely be accomplished.

Generally, we have by tactile examination no other means of

[1] In a few cases the sense of hearing is also had recourse to. I have repeatedly heard with the stethoscope a sound like the placental souffle in large fibrous tumours of the uterus. The uterine walls around these tumours are sometimes hypertrophied and thickened, exactly like the walls of the uterus in pregnancy, and their vascular structure undergoes a similar increase and mutation. Hence, probably, the origin of the sound in question. When present, I believe it to serve among others, as a diagnostic mark between fibrous tumours of the uterus and ovarian tumours.

knowing the probability of the apparent tumour being formed by the displaced fundus and body of the uterus, than by tracing along with the finger, between the tumour and cervix uteri, a direct *continuity* of structure, and this may be done either per vaginam or per rectum. But this physical sign is in itself apt to lead into error, if alone depended on. If the uterus is retroflected more than retroverted, the continuity cannot be traced at the point or angle of flexion; while, on the other hand, a fibrous or other tumour attached to the back wall of the uterus sometimes may be distinctly traced to be *in continuity* with the uterine structure, and moves with all motions imparted to the cervix. Nor is the position of the os uteri any more certain guide, for sometimes it is not displaced when the fundus is so; and it may be thrown forwards by a tumour, when the fundus retains its normal position.

Other and additional means, therefore, of diagnosis become necessary. M. Pereyra, of Bordeaux, suggested, a few years ago, to attempt to obtain a more correct physical diagnosis for retroversion, by conducting the examination by the rectum or bladder. "The difficulty," he observes, "of distinguishing diseased growths from retroversion of the uterus is greater than might at first be supposed; the only way of attaining a correct diagnosis is to ascertain if the uterus be or not in its normal situation. Two methods are proposed for this end; either the forefinger is introduced into the rectum, or a male catheter into the bladder, by the extremity of which instrument an exploratory process is conducted. The latter mode, treated of by Malgaigne,[1] requires, of course, some tact, but to the experienced surgeon it will give the more certain indication."[2]

The determination of the case by an examination per rectum is impossible; and I have elsewhere shown that Malgaigne's method of diagnosis is attended with difficulties and uncertainties that render it quite useless in practice.[3]

A far more simple and certain method is to determine the precise situation of the fundus and body of the uterus, not through either the intestinal canal behind, or the urinary canal in front, but through the intermediate genital canal itself. The proper canal of the uterus is, of course, too narrow to allow us to introduce our finger into it; but by passing into it a slender metallic finger, if we may so speak, we can easily by it ascertain, amongst other

[1] *Thèse du Concours*, 1833.

[2] *American Journal of Medical Sciences*, April 1843, p. 483.

[3] See p. 657.

matters, any change in the *direction* of its cavity, and consequently in the direction of the body and fundus of the uterus itself. The employment of the uterine bougie readily enables us to do this.

Examination by the Uterine Sound or Bougie.—The form, etc., of the uterine bougie is represented in Fig. 20, and consequently requires little or no description. Some years ago I gave a full account of the instrument and the mode of using it.[1] It has the configuration of a slender male catheter; tapering in form; knobbed at the extremity; divided into sections, so as to measure, when required, the length of the uterine cavity; and provided with a handle, smooth on its posterior surface and roughened on its anterior, that surface represented in the woodcut, in order to make the operator constantly aware of the position and direction of the point and concavity of the instrument, when it is passed into and hid in the uterine cavity.

This instrument can be easily and readily passed into the uterine cavity, so as to enable us to measure its depth; to examine, more distinctly than we have otherwise the power of doing, its fundus, body, and cervix; to ascertain the presence of strictures in the canal; diseased states of the cavity and walls of the organ, etc. I have used it daily for five or six years past, and have never, in any instance, seen any serious irritation, or any bad result to the uterus, follow its employment; whilst it has enabled myself and others to detect and discriminate morbid conditions of this organ, that were, by any other means, entirely beyond the reach of correct diagnosis.

Its power of detecting retroversion of the unimpregnated uterus depends, as I have already stated, upon its directly and easily enabling us to ascertain the *direction of the uterine cavity*, and hence of the body and fundus of the uterus, which form the walls of that cavity.

When the uterus is in its normal position, and is placed with the long axis of the organ, and consequently the long axis of its cavity, in a line parallel with the axis of the pelvic brim, the point of the bougie, when introduced into the uterus, passes upwards and forwards in the direction of the umbilicus; and the concavity of the instrument, or the rough side of its handle, is directed towards the symphysis pubis. When, however, the uterus is retroverted, the point of the instrument, instead of passing up vertically and forwards, is resisted in that direction, and can only be passed

[1] See p. 616.

horizontally and backwards towards the hollow of the sacrum ; its concavity and the rough side of its handle thus looking towards the sacrum instead of towards the pubes, and at once showing the altered position of the cavity, body, and fundus of the uterus.

But the diagnosis may be made out still more completely and accurately by the further use of the bougie. For—

1. Besides showing, in the manner stated, the direction of the uterine cavity, and hence of the body and fundus of the uterus, by the direction in which the instrument itself passes—

2. We can ascertain by a vaginal or anal examination of the supposed tumour, that the extremity of the uterine bougie is lodged in *its* centre, showing the swelling to be produced merely by the displaced fundus of the uterus ; and—

3. After this, by turning the bougie gently round, so as to bring the concavity, or the rough side of its handle, to look to the pubes instead of looking, as at first, to the sacrum, we can replace the uterus, and feel it upon the bougie if required, through the abdominal parietes in front. We can thus certify to our own minds that we have nothing on the point of the instrument except the fundus uteri. And again, if necessary, by introducing a finger into the rectum or vagina, and then retroverting or replacing the uterus at will, we can as it were make and unmake, as often as required, the apparent tumour lying between the uterus and rectum, and thus further prove this tumour to be nothing whatever but the retroverted fundus uteri.

DIFFERENTIAL DIAGNOSIS OF RETROVERSION.

I have seen retroversion of the unimpregnated uterus not only very frequently and entirely overlooked, but also very often mistaken for other morbid states and lesions of the uterus. I shall point out the principal morbid conditions with which I have known it to be confounded, and the modes of distinguishing retroversion from them.

1. *From Pregnancy.*—In a considerable number of instances I have had occasion to see the feeling of fulness and apparently increased size of the uterus in retroversion mistaken for the earlier periods of utero-gestation. A few weeks ago I was called to a case at a distance from Edinburgh, where this error of diagnosis had led to much distress : from an unmarried lady, suffering severely from dysmenorrhœa and menorrhagia, being supposed by her medical

attendant to be pregnant and aborting, by his mistaking the retroverted fundus and body of the uterus for general enlargement of the organ. This error is still more liable to be committed when the retroversion is accompanied, as it sometimes is, with occasional amenorrhœa. Two or three years ago, I had under my care a patient with retroversion of the uterus and temporary amenorrhœa, who had been pronounced as undoubtedly pregnant, by her usual medical attendant, an excellent practitioner and lecturer on midwifery in another medical school. About the same time I had a patient under my own care with retroversion, who passed three successive menstrual periods; but I was certain, from no corresponding increase in the size of the retroverted uterus, that she was not pregnant. In this case the difficulty of the diagnosis was rendered the greater in consequence of the areolæ becoming darker and their follicles enlarged as in pregnancy. A drawing was made of the areolæ at the time; and afterwards, when the uterus was replaced, and the patient at last became pregnant, the areolæ were most certainly not deeper marked at the same period in the true, than they had been in the spurious pregnancy.

2. *From Fibrous and other Tumours in the posterior Wall, etc., of the Uterus.*—This is one of the most frequent errors of diagnosis which I have met with, and one into which, in former times, I myself frequently fell.

The attendant functional symptoms are in all respects the same; and on examination there is the same continuity of structure felt between the cervix uteri and the body lying between it and the rectum. In this way retroversion of the uterus has very often been mistaken for a morbid growth upon the back part of the uterus, and even described as such.[1] But the introduction and direction

[1] Dr. Hamilton, in his *Outlines of Midwifery*, describes retroversion as an "unequal projection" on the posterior part of the uterus. I have seen one or two patients whom he had pronounced in writing to be labouring under these "projections," and where the apparent tumour was the retroverted fundus uteri. In the work quoted he observes:—"An unequal projection of different sizes is occasionally discovered on the posterior part of the uterus, resembling in shape the tubera which form upon the surface of the liver, but differing from tubera in being of a more resisting texture, and in being pained on pressure. From the cases which have fallen under the author's notice, it appears to him that the following is the progress of this fortunately rare disease. At first there is a slight enlargement of the uterus, with a little thickening and tenderness of its posterior surface, occasioning a sense of bearing-down on making any unusual exertion, and an obscure gnawing pain towards the back part of the pelvis. In the progress of the disease the posterior surface of the uterus becomes more and more unequal, till at

of the uterine bougie at once enables us to solve the difficulty. The bougie passes backwards into the very body and centre of the apparent tumour, at once showing it to be the retroverted fundus uteri. It may be proper, however, to add that instances are by no means rare in practice of the presence of small fibrous tumours attached to the posterior wall of the uterus being conjoined with retroversion.

I have known the retroverted fundus uteri to be pronounced a carcinomatous tumour, local thickening of the back walls, etc. The differential diagnosis is readily made, in the way I have just mentioned. When it has occurred after delivery, I have seen it mistaken for the common puerperal hypertrophy of the uterus. The means of differential diagnosis are the same. And cases, in which the apparent swelling formed by the back wall of the deflected uterus have been, out of the pregnant and puerperal states, mistaken for simple general hypertrophy of the uterus, and assiduously treated by mercury, iodine, etc., have frequently come under my notice.

3. *From Ovarian Tumours in their earlier Stages.*—When the ovary enlarges from multilocular degeneration, or other causes, it almost always first grows downwards into the space lying between the back wall of the uterus and the anterior part of the rectum, resting thus upon the roof of the vagina behind. In its enlargement it almost invariably pushes the uterus anteriorly, and *before* it; and this relative position of the uterus to ovarian tumours is often an important matter in the diagnosis of ovarian disease in its latter and more advanced stages. At first the body of the enlarged ovary may be mistaken for the retroverted fundus uteri, more especially as the os uteri is generally displaced forwards. But the introduction of the bougie shows the uterus to be in its normal situation, and at the same time generally enables us to draw the uterus so far forwards as to make us certain that it is not attached to the existing tumour, and does not form one continuous structure with it. So far the evidence is merely negative. If further

last a distinct projection like a walnut, or even larger, can be felt on examination per anum. At this stage of the disease the patient can neither stand nor sit upright, such is the continued uneasiness in the back part of the pelvis. It is remarkable that in this, as well as in several other of the local diseases of the uterus, the catamenia continue to flow as usual. In the early stages of this disease the progress has been generally checked by the means employed in cases of chronic enlargement of the uterus; but in the latter stages—that is, after the circumscribed projection has taken place—no other means of treatment have hitherto proved successful."—*Outlines of Midwifery*, p. 134.

evidence of a positive kind, of the nature of the tumour, is required, we may obtain it by the use of a fine exploring needle, a means of diagnosis of great value in this as in other complications.

4. *From Pelvic Cellulitis.*—Inflammation of the cellular tissue of the pelvis, limited or more diffuse, is certainly a frequent disease, both after delivery and in the unimpregnated state. I have seen it now at many different periods of life, from six years up to sixty. It is generally spoken of as "pelvic abscess," but improperly so, for it does not always necessarily terminate in abscess, any more than pleurisy necessarily terminates in empyema. When the inflammatory effusion seems limited, as it sometimes is, to the space between the uterus and rectum, the firm tumour, or swelling formed by it, may be mistaken for retroversion. The direction of the bougie, when introduced into the uterus, will show us, however, that the uterus is *not* retroverted; and the accompanying symptoms, and, if necessary, the use of the exploring needle, will enable us to complete the diagnosis.

5. *From Extra-uterine Conceptions lodged between the Uterus and Rectum.*—Nauche[1] mentions a case in which an extra-uterine conception was mistaken for a retroverted uterus. I lately met with an instance where it was a matter at first of great doubt and difficulty, whether a tumour lying on the anterior wall of the rectum, and accompanied with sudden symptoms of rupture into the peritoneum, was an enlarged and retroverted uterus, or an extra-uterine conception. Examinations with the bougie at once showed the uterus to be both normal in its size and in its position.

6. *From Organic Disease in the Anterior Wall of the Rectum.*—In a case of Dr. Marnoch's, the tactile examination of a tumour lying between the uterus and rectum gave me the idea that it was a retroverted uterus. The employment of the bougie, however, showed the uterus to be normally placed. On more minutely examining per anum, the anterior wall of the rectum was found much thickened and indurated; the patient died some months subsequently of carcinomatous stricture and disease of the rectum.

7. *From Stricture of the Rectum.*—The diagram of retroversion in Fig. 24 shows how readily this disease may be mistaken for stricture in the rectum; the deflected fundus uteri pressing in upon, and sometimes diminishing greatly, the calibre of the bowel. But the use of the bougie always readily dispels the difficulty, by showing first the direction of the fundus, and secondly, when the instrument

[1] *Maladies des Femmes*, p. 108.

is turned round, by at once removing the fundus and the supposed stricture. But I know that the mistake of confounding a retroverted uterus with stricture of the rectum is by no means infrequent in practice. Sir Charles Bell states that he had found a surgeon employing rectum bougies for years, on account of an obstruction from displaced uterus.[1] A case of retroversion of the unimpregnated uterus some time ago came under the care of a medical friend of mine in Edinburgh. He discovered the displacement, introduced the wire pessary (Fig. 27), which I shall afterwards describe, and at once rendered his patient comfortable, and capable of taking exercise. She returned to her own distant home, with a line to her physician, who declared he knew the instrument well, but thought

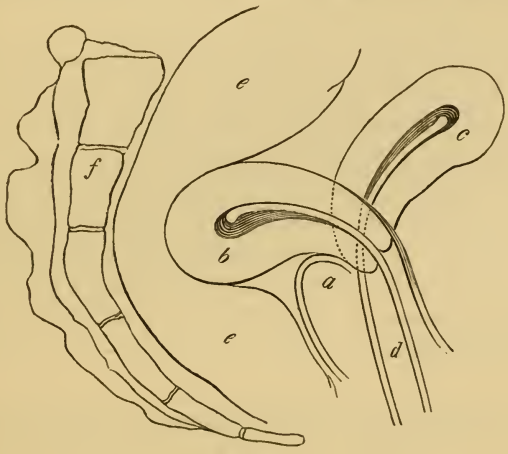

Fig. 24.

it necessary to take it out at the menstrual period, and could not again replace it. Another distinguished obstetrician was called in his place. He said the uterus was enlarged, and not displaced; used leeches, etc. Not finding the desired benefit from this treatment, the lady placed herself under the care of an eminent surgeon, who pronounced all the previous opinions wrong, and that the real disease was stricture of the rectum. The last time I heard of the patient she was submitting to the frequent use of bougies for the cure of this imaginary affection.

Fig. 24 is a diagram of the position of the retroverted uterus, *b*; and its replacement to *c* by the sound, *d*; *f* being the sacrum; *e* the rectum; and *a* the vagina.

[1] *Institutes of Surgery*, vol. ii. p. 216.

RETROVERSION LIABLE TO ESCAPE NOTICE EVEN IN POST-MORTEM EXAMINATIONS.

In the preceding pages I have spoken of retroversion of the unimpregnated uterus being with extreme frequency entirely mistaken in practice, and overlooked during life. But even after death the same error is liable to occur. Dr. Robertson details[1] a case most illustrative of this remark. A woman died of tenesmus, constipation, and symptoms of obstructed bowel, ending in enteritis. Before death the rectum was examined for the obstruction, and the gut was found "encroached on by a tumour which, per vaginam, was discovered to be the uterus." "But," adds Dr. R., "on the post-mortem examination, to our surprise, no uterine *tumour* was found to encroach on the rectum." In this, as in other cases in which retroversion of the uterus has existed, the morbid displacement has, on the inspection of the body after death, escaped notice, from the form and structure, and not the mere *position*, of the uterus being looked to. In our common post-mortem method of examining the pelvic contents from above, the attention of the morbid anatomist is rarely or never directed to the observation of any mere deflection of the fundus and body of the uterus; and when once the parts are dragged out of their situation, it is impossible to ascertain the amount and degree of retroversion.

ORGANIC STATE OF THE UTERUS IN RETROVERSION.

This is very variable. I have seen it several times co-existing with the presence of fibrous tumours in the uterine parietes. More frequently the uterus is hypertrophied merely from chronic metritis, and the enlargement more especially marked in the posterior walls. The organ is at the same time elongated as well as hypertrophied; and its cavity, instead of measuring two and a half inches in length, will measure three or three and a half inches. Many authors seem to think that enlargement of the uterus, under some form or another, is a necessary preliminary to retroversion taking place, and that we never meet with the displacement, without finding it combined with some increase in the size of the organ. Such, however, is assuredly not the fact. In a large proportion of cases the retroverted uterus is in no degree enlarged or increased in volume, but natural in size.

[1] *Edinburgh Medical and Surgical Journal* for 1822, p. 525.

Nay, I have on more than one occasion seen the uterus retroverted, when it was less than normal in its length and dimensions. Latterly I have happened to be consulted in several instances of amenorrhœa in women advanced beyond twenty or thirty years of life, in whom the menstrual secretion had never appeared, and where, on examination, the uterus was found imperfectly developed, and the length of its cavity, as measured by the uterine bougie, was not above one, one and a half, or at most two inches. In one of these instances, in which the cavity of the uterus was only one and a half inches long, the fundus of the preternaturally small organ was, at the same time, distinctly retroverted, and felt like a small roundish tumour through the vagina and rectum. Some time ago I saw, with my friend Dr. Girdwood of Paddington, a case still more rare. The uterus was retroverted, as he had ascertained by examination and the use of the bougie. There was a second orifice in the cervix uteri. On introducing a second bougie into this additional orifice, I found it pass into a second uterine cavity, quite separated and distinct from the first, and with the fundus of each diverging from the other. In fact, the uterus was not only retroverted, but double. It is, as far as I am aware, the first case in which a double uterus has been distinctly diagnosticated upon the living subject.

TREATMENT OF RETROVERSION OF THE UNIMPREGNATED UTERUS.

When recent, and occurring after some straining effort, or from congestion and inflammation of the uterus, or subsequent to delivery, mere replacement of the organ by the bougie or finger will sometimes suffice, provided, along with it, we enforce for a length of time the horizontal position, or rather lying on the side or face, prevent over-distension of the rectum and bladder, reduce any local congestive or inflammatory state that may be present, and restore the local tone of the relaxed soft structures of the pelvis by astringent vaginal injections, or by the use of medicated pessaries made with ointment containing extract of oak-bark, or tannin, or iodide of lead, etc.

But such simple treatment rarely succeeds, even when the retroversion is recent; and still more seldom when, as is almost always the case in practice, the displacement is already chronic and confirmed. Under these circumstances we have three principal indications to perform:—1. To remove, if necessary and possible, any morbid action in the uterine structures that may exist along

with the displacement. 2. To restore the uterus to its normal situation. 3. To use means to retain it in its replaced and natural position. I shall speak separately of these several indications.

1. *Removal of any Morbid State of the Uterus that may co-exist with the Retroversion.*—Not unfrequently, along with retroversion, the uterus is congested and hypertrophied, and the uterine bougie shows it to be elongated half-an-inch or more. Sometimes chronic inflammation of the body of the organ is present, and more especially in its posterior wall, which often feels tumefied and tender to the touch; or the cervix is enlarged, condensed, and ulcerated, especially in its posterior lip. The os uteri, or the uterine canal, an inch or so above the os, is not unfrequently contracted and strictured, and may have been giving rise to retention of the menses and congestion. Occasionally one or both ovaries can be felt through the roof of the vagina, enlarged and painful from congestive or inflammatory irritation. As a general rule, all these morbid states should, when possible, be reduced and removed, or at least moderated by their appropriate means of treatment, before engaging with the other indications to be fulfilled, particularly when they are apparently in any respect the *cause* of the retroversion. More frequently, however, they are the *effects* of the retroversion; and in this latter case our means of combating them will usually fail, or only partially succeed, till we have first restored the organ to its natural form and situation, by our fulfilling the second and third indications which I have laid down, before we fulfil the first. When the retroversion is combined with and produced by the presence of fibrous tumours in the posterior wall or fundus of the uterus, the first indication cannot, of course, be accomplished, as we as yet possess no certain power of removing and discussing these tumours.

2. *Restoration of the Uterus to its Normal Situation.*—Most authors who have treated of retroversion of the unimpregnated uterus have spoken as if its replacement could generally be fully effected by the fingers alone. In practice, however, its complete replacement by this means is almost always found to be impossible. By pushing up the retroverted fundus, or by pulling down the cervix, or by combining simultaneously both measures, the replacement can sometimes be effected by the fingers alone; but rarely. For it is scarcely ever possible, by any pressure which we can make with the fingers upon the posterior surface of the uterus, either through the vagina or through the rectum, to push the fundus uteri upwards and forwards to a sufficient degree. Some authors, finding

their fingers to fail, from their shortness, etc., have proposed instruments for the purpose. Richter and Evrat suggested a species of vectis or probang, to be used through the rectum. Bellanger, Lallemand, and Dugès, have spoken of introducing a strong sound into the urethra and bladder, to act as a lever upon the os uteri. Siebold and Drejer attempted to replace the uterus by instruments made of whalebone, introduced into the vagina, and made to press by their upper and blunted extremities upon the fundus uteri through the upper and back portion of the vaginal parietes.

The simplest and most easy method of temporarily replacing the retroverted uterus is by introducing an instrument into the cavity of the organ itself, and using it as a mechanical means or lever, for the purpose. In treating of the physical diagnosis of retroversion, I have shown how the uterine bougie can be readily used for this purpose. The very means of diagnosis are thus, at the same time, the very means of replacement.

3. *Retention of the Replaced Uterus in its Normal Situation.*—This is necessary to effect a cure. Some, as Schmitt and Schweighauser, have supposed that it could be accomplished by the mere position of the patient, and that lying on the side or face, with the pelvis somewhat elevated, would be sufficient. I have already stated that in few—exceedingly few cases, indeed—will it be found to succeed, and these only of recent origin. Instruments for the purpose of supporting and retaining the uterus *in situ* are therefore necessary. They have been proposed to be worn in the rectum,[1] and in the vagina.[2] Various forms and modifications of vaginal pessaries have been invented by Hervez, Drejer, Sander, etc. They are all intended either to press principally, by guarded stems or otherwise, through the roof of the vagina, upon the tumour formed by the fundus uteri; or to keep the cervix uteri pushed back, with the view of throwing the fundus forwards. I have used sponges for this last purpose; and Siebold and Kilian state, that they believe they form the best pessaries for retroversion, modified according to the necessities of each case. Moreau conceives that the principle of treatment should be to fill up the space between the uterus and rectum, so as to take away any room for the retroversion to recur: he uses a kind of caoutchouc pessary for this purpose. Two years ago I removed from a patient one which had been worn for some months, and which Moreau himself had introduced. It had not in any degree benefited the retroversion.

[1] Ætius, Vernandois, Desault. [2] Colombat, Dugès, etc.

After detecting the ease and certainty with which the uterine bougie could be used for the discovery of retroversion, and for the temporary restitution of the organ, it appeared to me that the most direct and perfect method of retaining the replaced uterus *in situ* would consist in some means of retaining and fixing, as it were, the end of the bougie for a time in the uterine cavity. I soon found that the restoration of the uterus temporarily, from day to day, with the bougie, was insufficient, and that some more permanent means of keeping the organ replaced and retained were necessary. But one primary and important point required to be solved:—Would the uterus bear with impunity the presence of such a body for a length of time in its own cavity? My first experiment on the subject I made with extreme anxiety, and great misgivings as to the result. I watched the case from hour to hour, and from day to day, and was delighted to find that the presence of the instrument was borne by the uterus without irritation or annoyance. The patient was almost entirely incapacitated from walking, by retroversion of the uterus, before it was used. After thus wearing for some months a wire pessary in the cavity of the uterus, she so far recovered as to bear two children, one in this country, and subsequently another in India. I soon found in other cases, that, when the instrument was once properly fitted and adjusted, it could be borne with perfect safety, and without any pain or inconvenience. Occasionally I have since met with cases in which the uterine pessary has created so much irritation as to render its withdrawal necessary in a few days after it was introduced. But these cases have been exceptions, and by no means common or frequent exceptions, to the general rule; and I have allowed the instrument sometimes to remain in the uterus for two, four, six months, or longer. Within the last few weeks I have removed two uterine pessaries, one of which I had introduced eight, and the other nearly ten months previously. They are not to be interfered with at the menstrual periods. Sometimes, though by no means always, a slight menorrhagia follows their use, particularly for the first period or two after their introduction.

It is unnecessary to detail the changes of form which were tried, and the difficulties I met with, in first attempting to construct a proper uterine pessary. The three forms which I have been in the habit of using for the last three or four years are those depicted in the woodcuts.[1]

[1] Mr. Young, our cutler in Edinburgh, makes them of German silver; sometimes he has electrotyped them for me, but this addition is unnecessary.

First Form of Uterine Pessary, Fig. 25, *a*, *b*, *d*.—The stem of the instrument, *d*, 2½ inches long, is introduced into the uterine cavity; the lips of the cervix uteri rest upon the flattened ovoid bulb or ball; *a* shows the lower surface of the bulb or ball, with an orifice in it to allow of the end of a staff, *c*, about 8 inches in length, to be fixed in it, for facilitating its introduction into the uterus. This form of pessary generally answers much better for anteversion than for retroversion. Occasionally I have had the bulb made of lead,

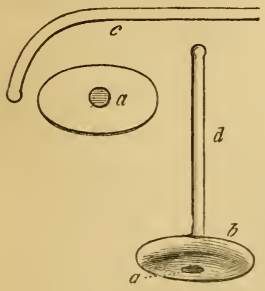

Fig. 25.

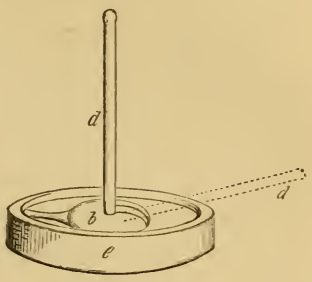

Fig. 26.

that it might serve as a counterpoise to hold the os uteri *in situ*. The instrument, however, is imperfect, from the impossibility usually of retaining it in the uterus above a few days, the canal relaxing and dilating, and allowing of its escape. In fact it is exactly the form of bougie which I generally use to dilate the os and canal of the uterus in cases of stricture, in any cases in which I do not employ the knife or hysterotome for that purpose.

Second Form of Pessary, Fig. 26, has a similar uterine stem and bulb, and in addition a large ovoid disc, 2⅝ inches in length, 1¼ inch broad, and ½ an inch in depth, to retain the instrument *in situ*. The bulb, *b*, for the cervix uteri to rest upon, is fixed in the middle of the disc, and the uterine stem, *d*, is movable to a certain extent upon it. This is necessary in consequence of the size of the retaining disc, and the impossibility of introducing the instrument into the uterus and genital passages, with the stem fixed upright, and at right angles to the plane of the disc. The dotted line represents the stem laid down, as is required in the introduction and withdrawal of the instrument. On the lower surface of the instrument, which is not seen in the figure, there is a spring-catch to hold the stem fixed and upright after the instrument is introduced, and capable of being unlocked by the nail when the instrument requires to be again withdrawn. The expanded disc, by pressing on the sides

of the vagina, enables the uterine portion of the pessary to keep its situation. In some cases this instrument answers well in retaining the replaced uterus. But occasionally, when the *tendency* to displacement is *great*, this form of pessary is altogether inadequate, and will be moved about by the changes of position which the uterus itself undergoes. The remaining form, which I most frequently employ, is free from these disadvantages. The two first forms are, when used, altogether concealed within the genital passages. In this third form a portion of the instrument is placed externally, and another internally.

Third Form of Pessary, Fig. 27.[1]—It is made up of two parts:—1. An *internal* part, provided, like the two preceding pessaries, with a stem, *f*, to pass into the uterine cavity; a bulb or ball, *g*, for the cervix to rest upon; and, in addition, a vaginal portion, or curvilinear tube, *h*. 2. An *external* part, consisting of a wire frame-work, *a*, *b*, *c*, to maintain and hold the internal portion *in situ*. This external part, or wire frame, is about 5 inches long; at its lowest or vaginal portion it is about $\frac{1}{2}$ an inch broad; and towards its upper or pubic portion, it suddenly swells out to 3 inches in breadth. From the vaginal extremity of this frame projects, at nearly right angles to it, a flat tubular portion, *c*, $2\frac{1}{2}$ inches long, closed at its farther extremity, like the point of a female catheter, and fitted to slide into and fix in the corresponding open tube, *h*, attached to the bulb of the internal half of the instrument, *g*.[2]

In the woodcut the uterine stem of the instrument is represented as placed in the cavity, *e*, of the uterus, a section of the organ, *d*, being outlined around it. In introducing the instrument, the internal portion, *f*, is first passed into the uterus and vagina, in the same way as the uterine bougie is passed for the purpose of diagnosis. The retroverted uterus is then replaced by raising it up upon this portion of the instrument, which is turned round for that purpose. After the organ is replaced, the solid vaginal portion attached to the external frame of the pessary is slid into the corre-

[1] The different parts of the pessaries are represented in the woodcuts as somewhat below their actual size. The bulb or ball is, in general, made an inch and a half long, one inch broad, and about half-an-inch thick. I have sometimes used a larger bulb. When smaller, it is apt to produce dilatation of the os uteri, and even to pass partially into it.

[2] I have a patient at present wearing one of these pessaries with a stem three and a half inches long. The retroverted uterus is enlarged and elongated by fibrous tumours in its walls, and one of the ordinary pessaries did not suffice to hold it replaced.

sponding vaginal tube, *h*, of the internal half of the instrument, locking into it on the same principle as the stilet locks into the canula of a curved trocar. Thus the instrument is, as it were, rendered at once completely solid and fixed. In order to have room to lock the two portions together, it is necessary, in general, first to bend back the pubic portion of the external frame-work to a very considerable extent, for the purpose of avoiding its being caught and impeded by the anterior part of the pelvis or pubes. After the

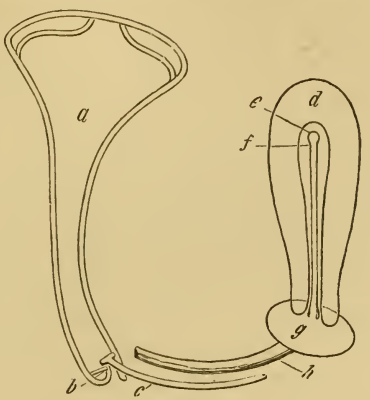

Fig. 27.

locking is accomplished, this pubic portion of the instrument is bent, and moulded upon the anterior portion of the pelvis, so as to fit it as exactly as possible. Formerly I was in the habit of attempting to keep the instrument more permanently fixed, by having elastic tapes fixed posteriorly into the apertures, *b*, and anteriorly into those still represented in the upper part of the pubic portion of the instrument; and both attached to a band encircling the trunk of the body. This arrangement I always now dispense with as unnecessary. If the pubic portion of the pessary is properly bent in over the pubes, it generally takes a sufficient hold; and if aught more is found necessary, all that is required, in addition, is, that the patient wear a common napkin, or understrap, to pass between the limbs and over the instrument. Latterly I have had the instrument made without the part, *b*, projecting posteriorly.

It is, perhaps, almost unnecessary to add that, if the instrument is found to press disagreeably on any part, it may be easily bent without removing it, so as to take off that pressure; and it may thus require to be remodelled and adjusted again and again in

various parts, in order that it may be ultimately worn without annoyance and inconvenience.

When required to be withdrawn, the pubic portion is first bent back, so as to be clear of the pubes; then the vaginal pieces are unlocked; and, lastly, the internal part is extracted.

The time during which it requires to be worn, in order to effect a cure, varies in different cases from one or two weeks to many months. The recent or chronic character of the case, and particularly the degree of tendency to the recurrence of the retroversion, are our principal guides on this head.

The employment of these uterine pessaries will cure many, but by no means all cases of retroversion of the unimpregnated uterus. And even when not sufficient to cure, they will generally relieve the patient, and palliate her annoyances and sufferings.

If the retroversion were causing no unpleasant symptoms, nor interfering with the functions of the uterus, I have always recommended the avoidance instead of the adoption of local measures and remedies, either mechanical or others. When the reverse was the case, I have employed the means I have mentioned, with the effect of curing many and of relieving others. In the few exceptional cases in which no pessary could be borne, in consequence of the irritable state of the uterus, or where they failed to produce a cure, I have contented myself with reducing this morbid state of the parts by leeching, external counter-irritation, the application of belladonna ointment pessaries, etc., and rest, in the first instance, followed afterwards by the employment of local and general tonic measures. The patient often derives much relief from wearing an abdominal bandage, as those of Hamilton and Hull, with a supporting perineal pad.

I have not entered into the consideration of the *Causes* of retroversion of the unimpregnated uterus. An explanation of these causes, and, indeed, of uterine displacement in general, is only to be found, I believe, in a complete study of the forms, relations, and functions of the different parts and layers of the pelvic fascia. In retroversion, those portions of this fascia which unite the back part of the uterus to the rectum and pelvic cavity behind, partially yield and give way. To restrengthen this support, and allow of its renovation, retention of the uterus for a length of time in the position and mode I have described often suffices. The simultaneous use of local injections and baths aids further the same view. But I allude here to the subject principally to observe that we may yet find further means of strengthening the weakened tissues, by indurating

and contracting the upper and posterior portion of the vagina, as by the use of caustics, thus taking advantage of that contracting and strengthening power of the new tissue of cicatrices which burned surfaces particularly have. I think I have seen the application of nitric acid and potassa to the posterior lip of the uterus produce replacement.

BIBLIOGRAPHICAL NOTE.

In the fifth century Ætius treated definitely and at length of retroversion of the unimpregnated uterus (*Tetrabiblos*, sermo iv. cap. 77); Moschion has left us some notices of it (Spachius' *Gynæcia*, p. 24); and in his work on female diseases, Roderic a Castro has some observations upon it (*De Universâ Muliebrium Morborum Medicinâ*, p. 274). In modern medical literature, the first individual case of retroversion of the unimpregnated uterus that was put upon record was reported by Saxtorph, in 1775 (*Collectanea Hauvniensia*, vol. ii. p. 129). In 1779, Willich described a second case (Richter's *Bibliothek*, vol. v.) In 1786, in a woman who died of pulmonary disease, Peter Frank found the uterus greatly retroverted, and published a notice and drawing of the displacement (*Opuscula Posthuma*, p. 78). In 1787, Jahn noticed its occasional occurrence in the unimpregnated uterus, but considered it "too obscure and too unimportant to deserve the name of a disease," (*Dissertatio de Utero Retroflexo*, in Schlegel's *Sylloge Operum Minorum Præstantiorum ad Artem Obstetricam*, etc., p. 612). A few years subsequently, Schneider (Richter's *Bibliothek*, vol. xi.) and Kirschner (Stark's *Archives*, vol. iv.) published each a case of this affection. In 1817, Schweighauser of Strasburg pointed out that retroversion of the unimpregnated uterus was far from being rare, and he asserted it to occur much more frequently than in the gravid uterus (*Aufsätze über einige physiologische und praktische Gegenstände der Geburtshülfe*). In 1820, Schmitt published at Vienna an essay taking the same view (*Uber die Zurückbeugung de Gebärmutter bei Nichtschwangeren*, etc.) Subsequently individual cases of retroversion of the unimpregnated uterus, or more general remarks regarding it, have been published by D'Outrepont (*Zeitschrift für Geburtskunde*, 1827), Denman (*Introduction to the Practice of Midwifery*, p. 138), Cooper (*Anatomy and Surgical Treatment of Abdominal Hernia*, part ii. p. 59, 1827), Robertson (*Edinburgh Medical and Surgical Journal*, 1822, vol. xviii. p. 520), Velpeau (*Traité de l'Art des Accouchemens*, vol. ii. p. 622), Bazin de Bassenéville (*Mémoire sur la Rétroversion de*

l'Utérus, 1837), Moreau (*Traité Pratique des Accouchemens*, vol. i. 1838), etc. etc. I have referred in a preceding page to the first observations which I published on the matter, in the Abstract of the *Proceedings* of the Medico-Chirurgical Society of Edinburgh. I shall extract these remarks from the *Monthly Journal of Medical Science*, for July 1843, p. 660 :—"As one of the most important of all these applications of the uterine bougie, Dr. Simpson demonstrated that, by showing the direction of the uterine cavity, and hence of the uterus itself, and by its enabling us, when it is introduced, to change at will the position of the organ, it afforded a simple means of detecting those displacements of the unimpregnated uterus known by the names of retroversion and retroflexion, anteversion and anteflexion—states that Dr. Simpson further showed were very common, and which, from the want of proper means of diagnosis, had been almost constantly mistaken for fibrous, carcinomatous, and other tumours situated between the uterus and rectum, or between the uterus and bladder. In cases of retroflexion and anteflexion of the unimpregnated uterus, the organ can with facility be temporarily restored to its normal position and relations, by turning the uterine bougie, when used as a means of diagnosis. Dr. Simpson proposed to maintain and fix the bougie in the uterine cavity for a length of time as a means of cure. He laid before the Society a number of utero-vaginal pessaries, which had been used by him for this purpose. They were constructed of nickel and silver wire, and had each attached to them a part which passed up to the fundus uteri. Some of them had been worn for weeks and months in the uterine cavity, and had produced little or no irritation." In 1846, Dr. Rigby published some excellent and accurate observations on the disease (*Medical Times*, p. 292, etc.); and more lately Dr. Protheroe Smith has written on the subject (*Obstetric Record*, p. 35, etc.); see also Mr. Hensley (*Provincial Medical and Surgical Journal* for January 1848); and Dr. Beatty (*Dublin Journal* for November 1847); etc.

[Of late years Simpson did not often employ the above instruments in the treatment of retroversion of the uterus. In the great majority of cases of retroversion requiring mechanical replacement, he simply used vaginal pessaries made of gutta percha or of vulcanite, and shaped like a horse-collar, or like some of Hodge's patterns. The intra-uterine stem he continued to have recourse to occasionally in retroversion, and in anteversion, when vaginal supports failed to give relief.—J. W. B.]

ASCENT OF THE UNIMPREGNATED UTERUS.

(ELEVATIO UTERI).[1]

No subject in uterine pathology is better known to the practitioner than the displacement of the uterus downwards, or the so-called *Prolapsus Uteri*. But the occurrence of the ascent, or displacement of the uterus upwards, has been left comparatively unnoticed. In my observations on paracentesis, I have alluded to its elevation and position upwards in front of an enlarged ovarian tumour, as occasionally rendering it liable to be injured by the trocar of the surgeon. Voison has published a case in which the elevated uterus was fatally wounded from this cause, in the operation of tapping an ovarian dropsy.[2] I have seen several instances of multilocular dropsy of the ovary, in which the uterus was drawn up and elevated more or less in front of the ovarian tumour, but only very rarely so as to be beyond the reach of the finger. The same upward displacement, or *Elevatio Uteri*, occasionally happens in connection with the presence of fibrous uterine tumours. In cases of fibrous tumours, I have known this displacement so great that the os and cervix uteri could not be readily or at all reached by a vaginal examination with the first finger or fingers of the right hand, till the mass of the tumour was pressed downward, and, at the same time, somewhat rotated forwards upon its transverse axis by the left hand placed externally upon the abdomen. Within the last two weeks I have met with an instance of this elevation of the uterus to a higher degree than I remember to have previously observed. The displacement in this instance has occurred in connection with the presence of several large fibrous tumours in the uterine parietes.

Case I.—The patient, aged forty, had been married twenty years, had borne one child about a year after marriage, but had never been again pregnant. The abdominal cavity is now distended by a mass of dense, firm, fibrous uterine tumours, which stretch upwards to nearly the scrobiculus cordis, and are altogether as large as the uterus in the eighth month of pregnancy. The mass consists of one great tumour stretching upwards above the umbilicus, and superadded to this are several comparatively smaller masses above and laterally, forming tuberose elevations and projections upon the sides of the larger central tumour. One of these smaller tumours, situated towards the left side, of a flattish form, and about two and a half inches broad, is pediculated and mobile, like a peritoneal polypus. On examination per vaginam, a rounded elongated portion of the largest tumour is felt pressing low down into the pelvis, and filling up the space in front

[1] See *Edinburgh Monthly Journal of Medical Science*, October 1852, p. 366.

[2] *Recueil Périodique de Médecine*, vol. vii. p. 362.

of the rectum. The vagina, from the lowest point of the tumour upward, is narrowed and flattened between the tumour and the pubes ; but the finger, when passed along this contracted canal, cannot reach the os or cervix uteri. In fact, a sound passed into this canal runs a considerable distance upward from the vulva before it touches the upper extremity of the vagina, and consequently before it reaches the cervical portion of the elevated uterus ; and the end of the sound arrested at the junction of the vagina and uterus can be felt through the abdominal parietes *as high as two and a half inches above the upper edge of the symphysis pubis.* The body of the uterus can be felt as a flattened projecting mass above this part.

This patient, who has come for medical advice from Australia, was there considered to be labouring under ovarian dropsy ; and it was supposed to be a case admitting of removal by operation. But that it is a fibrous tumour, and not a multilocular cyst of the ovary, is certain from its slow growth, from the density of the tissue of the tumour, from the arrangement alluded to of superadded external tumours, and from one of these superadded tumours having become pediculated like an external polypus—a morbid arrangement which we never see in ovarian disease. Besides, there is this common, and, as I believe, pathognomonic sign present, that in various parts of the larger tumour, and particularly on its right side, a loud souffle is heard synchronous with the pulse, when the stethoscope is used —a phenomenon very common in fibrous tumours embedded in the substance of the parietes of the uterus, but which I have never met with in any instance of dropsical disease of the ovary. The affirmative evidence of the enlargement being a fibrous uterine tumour, which can be usually derived from the simultaneous movement and union of the mass of the tumour with the body and cervix uteri, under a combined abdominal and vaginal examination, is here of course wanting ; in consequence of it being impossible to reach the elevated uterus. Nor, for the same reason, can we take advantage of those other means of diagnosis between fibrous tumours of the uterus and cystic degeneration of the ovary, which depend upon the respective measurements of the length of the cavity of the uterus in these two diseases, as ascertained by the employment of the uterine sound.

At present I have under my care, from Berwickshire, a case of very large fibrous tumour of the uterus, in which the os uteri is elevated above the pubes ; though not to the great height mentioned in the preceding instance.

Case II.—The patient, æt 38, has been married seventeen years, but has had no family. Menstruation has been regular ; and only lately somewhat menorhagic. Her general health is good. About ten years ago she first noticed an

abdominal enlargement, which has gradually and slowly increased. The tumour is now of as great size as the uterus at the ninth month of pregnancy. It touches the lower edge of the ribs upon the right side. Its external form, however, is somewhat irregular, particularly from a large projection upon it towards the right iliac region. The tumour is not so firm in consistence as fibrous tumours generally are; and towards its centre, and near the umbilicus, it feels comparatively so soft as to give a deceitful idea of fluctuation, like that sometimes imparted by subcutaneous adipose tumours. Three months ago a trocar was passed in this situation, without drawing off any fluid whatever. There is a deep musical souffle, synchronous with the pulse, to be heard on the sides of the tumour, particularly on the left side. On making a vaginal examination, the os uteri cannot be reached, but a decreasing, conical-shaped cavity may be felt, passing up in front of the tumour, and somewhat towards the left side. When the patient is placed upon her face, and the finger deeply passed along and behind the symphysis pubis, the os uteri can with considerable difficulty be touched, lying above the upper edge of the pubes. The uterine bougie, when introduced into the os, passes readily for several inches, showing the uterus to be elongated and hypertrophied upon the side of the tumour. In this instance, there is no projection downwards of the tumour, as in the preceding case, into the pelvic excavation. The pelvic cavity is, in fact, quite free, and the roof of the vagina is altogether higher than usual.

It does not seem difficult to understand the mechanism by which the uterus becomes morbidly elevated in such cases of ovarian and uterine disease as I have alluded to in the preceding remarks. If an ovarian or fibrous tumour, attached organically to the back wall of the uterus, grow downward upon the roof of the vagina, or, in other words, into the reflection of peritoneum between the rectum and uterus, and develop itself steadily in this its *lower* segment, the extension of the tumour in this downward direction, upon the resisting roof of the vagina, forces the tumour to lift the uterus, which is attached to the anterior surface or body of the tumour, higher and higher with it during the longitudinal development of the mass to which it is united. The tumour, in its downward longitudinal development, necessarily carries upward more and more the uterus affixed to its anterior part; in the same way as the uterus, in its own enlargement during pregnancy, carries and elevates upwards the Fallopian tubes and ovaries attached to its two sides. Or the enlarging uterine or ovarian tumour may, as in the second case detailed above, obtain a similar elevating influence upon the uterus, by resting its lower and growing segment upon the pubes or sides of the brim of the pelvis, instead of upon the roof of the vagina; thus ultimately displacing the uterus upwards by somewhat the same kind of mechanism, as the os and cervix uteri are often, in common pregnancy, raised upwards and backwards above their usual level for some time after the uterus expands into the cavity of the

abdomen, and rests, during its enlargement, upon the anterior circle of the pelvis.

Morbid ascent or elevation of the uterus sometimes occurs in connection with other morbid states besides the two mentioned—ovarian dropsy and fibrous uterine tumours. Occasionally, indeed, the cervix uteri, and, consequently, the whole organ, is found placed at an unusual height from the vaginal orifice as a natural conformation; and in advanced life, when the uterus becomes atrophied, it sometimes is situated higher than natural, with the vagina drawn upwards in a funnel shape. I have seen it displaced upwards from diseased action in connection with, and as a result of, pelvic cellulitis or pelvic abscess; as well as from the effects of simple pelvic peritoneal inflammation and adhesions (*Perimetritis*).

TREATMENT OF CHRONIC INVERSION OF THE UTERUS.[1]

Sir J. Y. Simpson had seen several cases of inverted uterus, days, weeks, and months after the accident had happened. He had, in some of the instances, succeeded in re-inverting the inverted uterus, by steady pressure upwards upon the fundus of the displaced organ, the patient at the same time being chloroformed. He was certain that in some, if not in all cases where a chronically inverted uterus was thus replaced, a fissuring or split occurred in the cervix uteri, or at the point of inversion. In one instance he felt the fissuring with the finger, and it seemed to extend through all the coats of the organ; but in this, as in other instances, the patient made an uninterrupted and perfect recovery. In one case, which he saw with Dr. Keiller, where inversion occurred in consequence of disease, and not of the puerperal state, both Dr. Keiller and he failed in reducing the organ, and in that instance it had become a question whether an incision of the cervix to imitate the fissuring would not allow of the replacement of the displaced fundus uteri. Possibly, in such chronic cases, it may yet also be found that an instrument can be passed through the inverted fundus or body of the uterus, so as to reach the site of the peritoneal contraction at the point of inversion, and mechanically and straightway dilate it so as to admit of the return of the fundus of the organ.

[1] See Proceedings of Edinburgh Obstetrical Society, March 13, 1867, in *Edinburgh Medical Journal*, July 1867, p. 67.

Any dilator would need to be a metallic one, without any cutting edge, and might be passed through an orifice in the fundus or walls made by a trocar or knife. Perhaps it would be found safer than the removal of the inverted fundus by the ligature or knife, as if it were a polypus, an operation which had been successful in the hands of Dr. Johnson and others.

INFLAMMATORY ERUPTIONS UPON THE MUCOUS MEMBRANE OF THE CERVIX UTERI.[1]

The common forms and effects of inflammation of the cervix uteri—viz. ulceration, hypertrophy, and induration of the cervix—were now well known to the profession. But the surface of the cervix was liable to other types of inflammation of an eruptive character, which apparently had hitherto been little, or not at all, studied by obstetricians; and were not yet described in works upon the pathology of uterine diseases. Among these special inflammations of the cervix uteri and top of the vagina, Dr. Simpson had observed eruptions referable to the vesicular, pustular, tubercular, papular, and erythematic orders of the classification of Willan and Bateman. *Herpes* (*herpes uterinus*) he had seen following the usual course of *herpes labialis* in two or three instances, in patients who had months previously been under treatment for common ulceration of the cervix; and Dr. S. suggested that perhaps this and other eruptions were occasionally the origin and basis of the common variety of granular cervical ulcer. *Acne*, in the form of chronic hard tubercles and pustules, was by no means uncommon, and often co-existed with common ulceration. A papular form of eruption sometimes supervened in chronic cases of uterine disease, and was usually diffused over both the cervix uteri and interior of the vagina; sometimes having the characters of *Lichen;* in other instances presenting the appearances and severe itching symptoms of *Prurigo*. *Eczema* and patches of *Aphthæ* also occurred. The treatment required to be varied according to the nature and character of the eruption, and consisted of the application of nitrate of silver, of medicated washes and medicated pessaries, etc. In severe and distressing cases of prurigo of the cervix, vagina, and vulva, brushing the affected surface often with hydrocyanic acid (the strength of that of the

[1] See Proceedings of Medico-Chirurgical Society of Edinburgh, March 6, 1850, in *Edinburgh Monthly Journal of Medical Science*, April 1850, p. 386.

Edinburgh Pharmacopœia), was mentioned as frequently giving the greatest relief.

TREATMENT OF INFLAMMATORY INDURATION OF THE CERVIX UTERI BY DEEP CAUTERISATION WITH POTASSA FUSA.[1]

Dr. Simpson stated that his own observations fully confirmed the recorded opinions of Dr. Bennett and others regarding the general dependence of leucorrhœa upon inflammatory ulceration and induration of the cervix uteri. He had found inflammatory enlargement and induration of the tissues of the cervix very frequent in practice, and existing, in fact, in most cases of very chronic and aggravated leucorrhœa. In practice he had seen it mistaken for the induration and ulceration of carcinoma, etc. Formerly, in the treatment of these common cases, he had employed the frequent local application of leeches, and counter-irritation to the sacrum, etc., with the use of pessaries of mercurial and iodine ointment, keeping the indurated tissues imbedded in these applications, etc. The cure in this way is tedious, and months are often required before the indurated parts become reduced. Various local escharotics, partly to destroy the indurated tissues by direct decomposition, and partly to soften down the remainder by new inflammatory action, had been in modern times employed for the same purpose, and with much more certain and expeditious effect. He had in this way employed in a number of cases nitrate of silver often applied, Vienna paste (*potassa cum calce*), and nitric acid. He stated the particulars of a case which he had treated successfully four years ago with nitric acid, and he had lately seen the patient in perfect health; it was at the time supposed that she had cancer uteri. Latterly, he had abandoned these and other escharotics, and now always used the common *potassa fusa*. He had found it far more manageable, speedy, and certain, than any other method. He used it of course through the speculum, applying a stick of it freely with a proper caustic-holder to the ulcerated and indurated tissues. It required to be rubbed or held *strongly* for a time against the part which was to be destroyed. In general a piece three-quarters of an inch, or an inch long, was melted down. The decomposition produced by it often

[1] See Proceedings of Edinburgh Obstetrical Society, April 13, 1847, in *Edinburgh Monthly Journal of Medical Science*, July 1847, p. 71.

caused a hissing sound. If the induration is extensive, and the whole cannot be removed at once, increased action and absorption are set up in what remains, and the parts adjacent become softened and diminished in size. Absorption in this way is truly one of the results or consequences of inflammation, though still an undescribed termination. In some aggravated cases two or more applications of the caustic are required, at intervals of eight or ten days. He had never seen pelvic cellulitis, or any other bad result, follow. The appearance after the operation is as if a portion had been clean cut out with the knife. A large quantity of vinegar and water is immediately thrown up through the speculum to neutralise the potassa, and prevent it from injuring the sound parts. A copious purulent discharge usually follows for several days, requiring the use of astringent washes, or zinc ointment pessaries. When the whole of the induration is once removed, the remaining ulcer heals rapidly and permanently. An ulcer over an indurated part may be cicatrised, but it is almost certain to break out again and again till the induration itself is reduced.

[Simpson used potassa fusa as a caustic far less frequently than might be inferred from the foregoing article. Latterly, at least, he reserved it for unusually obstinate and troublesome inflammatory induration, and for nodular projections on the surface, of the cervix uteri.—J. W. B.]

ON THE MORE COMMON TERMINATIONS, AND ON THE TREATMENT OF FIBROID TUMOURS OF THE UTERUS.[1]

By far the most frequent form of organic disease met with in the body and fundus of the uterus, is that species of growth which usually passes under the name of the "fleshy," "fibrous," or "fibroid" uterine tumour. These tumours, which generally affect a roundish form, and are almost always gregarious, vary greatly in size. They are sometimes not larger than peas or hazel-nuts, and occasionally they acquire, singly or gregariously, the size of a uterus at the sixth month, or even at the full term of pregnancy. Their anatomical relations and characters, their symptoms and general treatment, I have dwelt upon at some length in another work.[2]

[1] See *Obstetric Memoirs and Contributions*, vol. i. p. 114.

[2] See Essays on the Diseases of the Uterus, in the *Library of Medicine*, vol. iv. p. 332.

In former times, the common fibrous or fibroid tumours of the uterus were generally considered as malignant in their type, and too often confounded with cancer. Some obstetric writers of the present day even look upon these fibrous uterine growths as having a kind of scirrhous or carcinomatous nature. And no doubt the texture of a chronic fibroid tumour may, like any other tissue, natural or morbid, become occasionally, though rarely, the seat of carcinomatous deposit. But primarily and essentially, they have nothing carcinomatous in their character, nor any tendency to undergo the changes to which carcinomatous structures are liable.[1] On the contrary, the changes to which they are subject are pathologically very different, and vary in different instances.

1. Fibroid uterine tumours sometimes go on growing—usually very slowly—sometimes intermittingly—and retain throughout life their original fibrous character, increasing merely in volume, without any specific change in their structure.

2. Often, after increasing for years, they entirely cease from further growth, without any further marked change in their size or structure. This termination appears to occur principally when the tumours are imbedded in the uterine walls, or are intramural in their seat, and when they are restrained in their development by the strength and denseness of the tissues surrounding them.

3. When they cease growing, however, the fibroid structure of the tumour is frequently found to become changed into cartilaginous tissue, and subsequently to become more or less the seat of osseous or calcareous degeneration; a transformation observed equally in the smallest fibrous tumours as in those of a larger volume. This calcareous degeneration in uterine fibroids seems to indicate the death, and consequently the cessation of the reproductive action, of those cells which form the essential growing constituent in these tumours.[2]

[1] I have now several times seen the uterine tissue with which a pediculated fibrous tumour or polypus was long in contact, become in those predisposed to cancer the seat of carcinomatous degeneration and ulceration, apparently from the constant irritation of the tumour as a foreign body upon the contiguous uterine tissue. Carcinoma of the cervix as well as of the cavity of the uterus is sometimes induced indirectly in this way, without the fibroid tumour or polypus itself degenerating into cancer.

[2] I have elsewhere tried to show (see Proceedings of Obstetric Society, in *Edinburgh Monthly Journal* for August 1847, p. 140), that we have a similar change and deposit in the case of some human entozoa—for example, the *trichina* and

4. In a few cases observed by Clarke and other pathologists, fibroid tumours of the uterus have appeared to undergo another and most important change, viz. they have gradually atrophied and become diminished both in volume and density.

If we looked upon fibrous uterine tumours as purely heterologous structures, it would be difficult indeed to believe in the possibility of their atrophy and involution — either spontaneously or under any form of treatment. But the more I have examined these structures of late years, the more have I become convinced that they are essentially and primarily homologous structures only, and that they essentially consist, in fact, of local masses, *nodose* collections, or hypertrophies, if I may so speak, of the normal fleshy or fibrous tissue of the uterus. Most physicians further are, we believe, ready to acknowledge that mere hypertrophies of the natural structures of organs sometimes diminish and are amenable to treatment; and we all know that the uterus, immediately after delivery, is in a state of great physiological hypertrophy, from which it is rapidly reduced by a normal process of involution or atrophy. During the process of puerperal involution the uterine structures undergo a fatty form of degeneration. Occasionally on dissection we have observed uterine fibroid tumours presenting what we conceived to be an analogous white fatty-like transformation. And during the last few years I have watched upon the living subject the progress of a number of cases of uterine fibroids that have appeared to me gradually to involve and atrophy to a greater or less extent under treatment.

In Germany, the waters of Kreuznach have obtained some repute for their supposed efficiency in the reduction of tumours, and especially of fibroid tumours, in the walls of the uterus. I have seen a considerable number of such cases after they had been subjected to full courses of this water drank internally, and applied locally. In most of them, this treatment had most completely failed; but one or two have appeared to benefit by it. I have seen a far larger proportion of cases do well under a long-continued course of bromide of potassium given in doses of from three to five grains taken thrice

cysticercus—the cyst belonging to and enclosing these entozoa ossifying or becoming calcareous after their death. At the same time I mentioned the interesting experiments of Rayer, in which that pathologist induced the artificial transformation of normal fibrous tissue, such as the ear of the rabbit, into cartilaginous and osseous substance, by the repeated or continued irritation of it. And as a result of these remarks, the possible artificial induction of osseous transformation, as an indication of treatment in fibrous uterine tumours, was suggested.

a-day; and sometimes combined with its local application, leeching, etc. The Kreuznach waters contain bromine; but only in very small quantity. If the bromine is, as it is supposed to be, the chief deobstruent in these waters, the methodic exhibition of this ingredient artificially in more powerful and continuous doses ought to be followed, as I believe it is, by more beneficial and decisive effects than the waters themselves. It stands thus in the same relation to the Kreuznach waters, as quinine does to cinchona. One of the first patients who used the bromine alone, with this view, I saw along with my friend Dr. Wyse. The lady had been at Kreuznach, and taken full courses of the waters there without any benefit whatever. The uterine fibrous tumour was of large size, and incommoded her much from its weight and pressure. Under a course of bromide of potassium and local leeching, continued in perseveringly for many long months, the tumour involved and decreased in a most marked manner; and her health and power of walking and exertion became quite restored. I have found the same remedy succeed in several similar cases, in arresting, and more or less reducing, uterine fibroids, and again, in others I have seen it fail. But to most persons the bromide of potassium can be given for a great length of time without any interference with the general health. In fact, it usually serves apparently as a tonic as well as a deobstruent, in this respect having a marked advantage over iodide of potassium.

5. When fibroid tumours are situated more immediately under the serous or mucous coats of the uterus, they usually become gradually more or less pediculated, forming fibroid polypi. Sometimes the pedicle becomes more and more attenuated, and at last gives way, allowing the tumour, when subperitoneal, to fall into the cavity of the abdomen (of which I have seen several instances); or, when it is submucous, the tumour or polypus drops into the cavity of the uterus and vagina, and thence escapes. The accoucheur imitates this latter process in the surgical removal of uterine polypi.

6. When the tumour is non-pediculated and intra-mural, another termination is occasionally observed. The tumour sometimes inflames, and sloughs, and the intervening uterine tissues ulcerating, it is ultimately eliminated from the genital canals in smaller or larger masses. I have seen several instances in which nature thus reduced, and threw off successfully by ulceration and gangrene, large portions and masses of intramural fibroid tumours. Attempts have been

made by Amussat, Maisonneuve, Atlee, and others, to imitate by the knife this process of spontaneous or natural elimination; but we believe it to be, from the cases which we have seen, an operation that, as at present practised, will very rarely indeed succeed, and which ought to be very rarely, if ever, undertaken.

ARTIFICIAL REMOVAL OF A LARGE FIBROUS TUMOUR IMBEDDED IN THE POSTERIOR WALL OF THE UTERUS.[1]

Dr. Simpson explained to the Society the mode in which he had lately removed a large fibrous tumour from the posterior wall of the uterus. The patient was forty-six years of age; she had borne ten children, the youngest being six years old, naturally strong and healthy. During the last two years she had been subject to severe floodings, which recurred every fortnight, and had reduced her excessively. Her general health had become quite broken up, and for several months she had suffered much from sore throat, and general irritation of the mucous membranes. He found, on examination, a large fibrous tumour imbedded in the back wall of the uterus, and protruding downwards upon the top of the vagina in a rounded form, the os uteri and uterine cavity lying in front of it—as ascertained by the uterine sound.

Accompanied by Drs. Malcolm, Ziegler, Weir, and Keith, he made an opening, by means of caustic potass, into the most prominent part of the tumour, about one inch behind the os uteri. It extended through the layer of uterine substance, and into the mass of the tumour itself. On inserting the finger into the hole thus made, it was found that it could be passed easily between the substance of the tumour and the uterine wall. The tumour, in fact, seemed to be very loosely connected with its uterine envelope, and could be separated from it with great ease as far as the finger could pass between them. Two days after the caustic was used, he found the artificial opening enlarging like the os uteri in labour, and the tumour beginning to protrude through it. It opened up gradually, the patient taking some ergot, and on the fifth day a large piece of the tumour was found pushed low down into the vagina, while the edge of the uterine wall could barely be felt, encircling it like the

[1] See Proceedings of Edinburgh Obstetric Society, December 22, 1847, in *Edinburgh Monthly Journal of Medical Science*, March 1848, p. 695.

rim of the os uteri when fully dilated. The abdominal tumour had subsided considerably. On the eighth day he attempted to pass a ligature round the mass, but found it could not possibly be made to include more than a very small portion. He separated, however, and brought away a small fragment, not without giving a good deal of pain. The tumour now gradually and more completely filled the vagina. The uterus, however, seemed unable to throw it off entirely, and the patient was getting exhausted from the quantity of the discharge, which was very fetid and offensive. On the twelfth day, Dr. Simpson, while she was completely under the influence of chloroform, passed up his hand by the side of the tumour, completed the separation of the remaining adhesion, like an adherent placenta, and brought away the tumour in one mass. This was done in a very few minutes. The patient awoke quietly, and said she had felt no pain whatever; nor did she complain at all of pain in the region of the uterus subsequently. She proceeded very well for three days, her pulse not above eighty; when, in consequence of her nurse having taken unwarrantable liberties with her in making her get out of bed, washing, etc., she was seized with rigors, followed by severe sore throat and irritative fever. This completely exhausted her remaining strength, and she died six days after the tumour was removed. The body was examined by Drs. Bennett, Scott, Simpson, and Keith. The peritoneal surface of the uterus was perfectly healthy, and showed no trace whatever of inflammatory action. The cavity in the back wall, in which the tumour had been imbedded, was much reduced in size, and appeared to be tending to a healthy cicatrisation.

The tumour weighed three pounds eight ounces when removed. It must have previously been somewhat heavier, as the great discharge for several days was no doubt from partial softening and decomposition of the tumour. Various French surgeons had cut down upon such tumours, and enucleated them by instruments, or by the hand. In the above case, Dr. S. had merely formed an artificial opening into the uterine cyst, as it were, containing the tumour, and then allowed the uterine walls, which are hypertrophied around such masses, exactly like the uterus in pregnancy, to push down and expel the foreign body. It was, he believed, the first time this new operation had been performed, and the largest fibrous tumour ever yet enucleated. The tumour, on division, was shown to be the common fibrous tumour of the uterus.

TREATMENT OF FIBROID TUMOURS OF THE UTERUS.[1]

Professor Simpson exhibited a uterus containing a large number of fibroid tumours of various sizes, in different situations, and in various stages of degeneration and development. Some were as small as peas, one was as large as the fœtal head, and there were others of every intervening size. Some lay immediately beneath the peritoneum, others were imbedded in the uterine walls, whilst a third set projected into the cavity of the uterus, invested with a more or less complete covering of mucous membrane. The largest of the tumours projected forward in this manner the mucous membrane, and its surface was considerably ulcerated. On being cut into, it was found to be very much softened and friable, and of a pinkish hue, from an increase in its vascularity. It had evidently been the seat of an inflammatory attack, which had led to this alteration in its texture, and which, had the patient survived, would probably have ended in the destruction and separation of the morbid mass. Most of the other nodules and nodular masses presented the ordinary characters of fibroid tumours still vital and progressive; but one of them, a sub-peritoneal one of medium size, was firm and gristly, and at one part of its circumference contained a thin calcareous or osseous layer. The patient had been the subject of many attacks of excessive menorrhagia, which he (Professor Simpson) had repeatedly checked by applying perchloride of iron to the mucous lining of the organ. Under the use of bromide of potass, etc., the patient seemed to improve in health, and thought, as he himself believed, that the mass had shrunk somewhat. She had returned to him, however, some months ago, suffering from pain and a recurrence of the menorrhagia. Inflammation set in in the peritoneum, probably spreading from the already inflamed tumour, and the patient sank.

He (Professor Simpson) had had in his ward last session a patient with an enormous fibroid tumour, which he had attempted to remove partially by means of the écraseur. The chain had given way, but the strangulated part sloughed; the mass contracted considerably; and the patient—who had been reduced to the last stage of weakness before, so that for a time her life was almost despaired of—was now going about in the enjoyment of tolerably good health. Where such tumours were not so large he had sometimes removed it by enucleation, but the operation was usually accompanied with

[1] See Proceedings of Edinburgh Obstetrical Society, November 26, 1862, in *Edinburgh Medical Journal*, February 1863, p. 766.

much danger, and was never perhaps justified, except when the hemorrhage was so great as to threaten life. Lately he saw a lady from Ireland, who for some years suffered from excessive menorrhagia, and from whom he removed a fibroid tumour of the size of a swan's egg, which was projecting in the form of a sessile polypus from the inner surface of the uterus. The patient was in a low and critical state for a few days after the operation, but she was now the picture of health.

ON THE DIAGNOSIS OF POLYPI GROWING FROM THE LIPS OF THE CERVIX UTERI.[1]

In polypi arising from any part of the interior of the uterus, and projecting into the vaginal cavity, the stalk of the tumour is always found more or less encircled by the lips of the dilated os and cervix of the organ. The tracing, with the finger, of this circle of the cervix, round the pedicle of the polypus, forms always an important diagnostic mark in such forms of the disease. Thus Dupuytren remarks, "The essence of diagnosis is always the exploration of the neck—of its central orifice, and of the circular cul-de-sac which separates it from the vagina."

When, however, a polypus arises from the edge of the os uteri or vaginal surface of the cervix, the above important diagnostic mark is wanting; and the case in consequence becomes one, the nature of which is often much more difficult to determine. Speaking of this form of the disease, Dr. Gooch states strongly the difficulty of diagnosis in such cases. "I have seen," he observes in regard to them, "the most experienced practitioners in London puzzled to tell what was the nature of the tumour in the vagina, and what ought to be done for it;" and Lefaucheux describes the appearances on dissection of a case of this form of polypus, which during life could not be discriminated from complete inversion of the uterus.

The difficulty of diagnosis of polypi of this kind, arising from the edge of the os uteri, or from the vaginal surface of the cervix, does not depend merely upon our not finding the pedicle of the tumour encircled, as usual in other forms of uterine polypi, by the dilated orifice of the uterus, but also from this still more fallacious circumstance, that the os uteri, though traceable in the stalk of the tumour,

[1] Part of a Clinical Lecture. See *London and Edinburgh Monthly Journal of Medical Science*, April 1845, p. 319.

is generally so displaced in situation, and altered in form, as to render its identity doubtful. "In these cases," remarks Lefaucheux, "the orifice of the uterus has always lost its natural form. It is found situated obliquely, and the lip of the cervix which is not the seat of the pedicle is the most elevated, the pedicle elongating, on the other hand, that lip to which it is attached. When the pedicle," he adds, "has taken its rise in the cellular tissue of the greater part of the circumference of the orifice of the uterus, it is sometimes very difficult to distinguish between such a polypus and inversion of the organ, for the remainder of the orifice forms only a kind of fissure, which is detected with difficulty, and through which it is impossible to introduce the finger." The difficulties attending the diagnosis of the form of polypus to which these remarks refer, would in most, if not in all cases, be perfectly removed, if we could assure ourselves that the body of the uterus itself was of the natural size, and in its natural position, and that the opening or imperfect cleft that may be traceable on the inside of the tumour was in reality the os uteri. If these points could be fixed with certainty, the attachment and nature of the tumour would become at once evident—the question of the propriety of its removal would be resolved—and the exact point of its removal more safely and certainly determined, than it otherwise could be; in those cases where the stalk grows from the cervix, the rule being, as laid down by Gooch, that the knife or ligature ought to be applied a little below the orifice, if it can be distinguished. These important points in diagnosis and practice we would, in future cases, propose to fix by introducing the sound into the uterine cavity, so as to determine the real situation of the os, and the position and state of the uterus itself, as ascertained by the direction and length of its cavity. The introduction of the instrument in particular cases of this complication will require unusual care and patience, in order to pass it through the displaced and altered uterine orifice, and a sound of a smaller size than usual may in some instances be necessary. But the clear information afforded by the examination in a set of cases that are so often doubtful and perplexing in their character, will amply repay the mastering of any such difficulties as I have presupposed in the employment of the means.

OF THE EXCISION OF LARGE PEDUNCULATED UTERINE POLYPI,

AND ITS ADVANTAGES OVER DELIGATION.[1]

A variety of operative means have been proposed and practised for the removal of uterine polypi, after they have once passed the os uteri and come within the reach of surgical interference. The means usually followed differ according to the size and consistence of the polypus.

In the removal of small and soft uterine polypi of the mucous or cellular type, practitioners employ—1, Simple avulsion with proper forceps, or with the fingers ; or 2, Avulsion by torsion ; or 3, Compression or crushing of the neck or body of the polypoid growth ; or 4, Scooping out its attachment with the nail, if the cervix is opened, or with the scraping or gouging instruments invented by Recamier and Dr. Locock ; and 5, The introduction and application of a stick of *potassa fusa* inside the os, followed by the free application of vinegar, is sometimes most advantageously had recourse to, where, as is often seen in practice, several small sessile or pediculated polypi—formed by dilatation of the Nabothian follicles—are attached to the lips of the os and along the interior of the cavity of the cervix uteri.

In the present communication, however, I wish only to speak of the larger and firmer forms of pediculated uterine polypi. These are usually fibroid or cellulo-fibroid in their structure, and vary from the size of a small walnut to that of a new-born child's head. In the removal of them one or other of the following operations is generally had recourse to—viz. either,

I. The slow and gradual division of the pedicle of the polypus by *Deligation*, or by the constriction of ligatures of silk, catgut, silver-wire, etc., applied by means of various forms of canulæ ; or,

II. The instantaneous division of the pedicle by *Excision* with the scissors, scalpel, or bistoury, and the consequent immediate removal of the amputated polypus.

Some practitioners combine together these two methods—

[1] See *Edinburgh Monthly Journal of Medicine*, January 1855, p. 10.

applying deligation first, and then—either immediately or some days subsequently—using excision or resection in addition.

In this country the operation by deligation alone has been the plan usually adopted. "In England," as Dr. Ashwell states, "the ligature has *always* had a decided preference."[1] "British practitioners have," says Dr. Hamilton, "*universally* agreed that the safe mode of operating is by ligature."[2] "I shall," observes Dr. Ramsbotham, "consider this as a point *settled*, at least in our island."[3]

The removal, however, of large uterine polypi by excision, has long appeared to me to be in many respects a simpler and a safer operation than their removal by ligature. It is, on the whole, more easily accomplished; the cure of the disease by it is infinitely quicker; it is accomplished with far less restraint and annoyance to the patient; with less risk of local irritation; and, as I believe, with less ultimate chance of actual peril to health and life.

Two objections have usually been urged by accoucheurs against the removal of large uterine polypi by excision. The first of these objections, viz. the danger of hemorrhage, has been particularly insisted on by those practitioners who have written in favour of deligation. But the fact is, that excessive hemorrhage is not common after division of the peduncle of the polypus; and however great that or any other traumatic hemorrhage from the unimpregnated uterus may be, it can always be arrested by properly filling the vagina for a few hours with pieces of sponge or other appropriate plug. Dupuytren, though using no plug or other means to prevent bleeding, only met with two cases of severe hemorrhage out of some two hundred instances in which he removed uterine polypi by excision; and Lisfranc only observed it twice out of one hundred and sixty-five similar operations practised by himself.[4] I believe, however, from what I have myself seen, that the practitioner, in employing excision, must expect considerable hemorrhage in a proportion of cases much greater than this; but at the same time he can, I repeat, always readily *arrest* it, when it does occur, with proper plugging; and it is perhaps best—as a general rule—to *prevent* and forestall its occurrence by introducing, for ten or twelve hours after every case of resection, a proper tampon of fine sponge into the vagina. Let me add, that it is well to have each piece of sponge which is used

[1] *Diseases Peculiar to Women*, p. 485.
[2] *Practical Observations on Midwifery*, p. 40. [3] *Medical Gazette* for 1835, p. 433.
[4] Lisfranc's *Clinique Chirurgicale*, vol. iii. p. 210.

previously transfixed by a strong thread, the end of which should be left out of the vagina, in order to permit of the more easy withdrawal of the plug.

The second objection usually urged against excision is of greater weight, viz. that more or less injury is always liable to occur to the pelvic attachments of the uterus, if it and the polypus are forcibly dragged down by Museux's forceps, or by hooked vulsella, so as to bring the peduncle of the tumour into view before dividing it,[1] a plan followed by most operators;[2] or, on the other hand, if the peduncle is divided while the polypus and uterus are *in situ*, the scissors or knife employed are, it is averred, apt to injure and cut the vaginal walls and neighbouring tissues, while worked within the vaginal cavity.[3]

Of late years I have used a means of excising large uterine polypi, that seems to me to obviate entirely this last class of objections, and by which, as I have been led to believe, the whole operation is much simplified, and rendered both greatly more easy to the practitioner, and more safe to the patient. By the means or instrument in question, the peduncle of the polypus is divided *in situ*, and without any chance of its cutting portion injuring the structures of the vagina or vulva.

The instrument, or polypus-knife, to which I refer, is sketched in Fig. 28. It is of the form of the usual midwifery hook; with the concavity, however, of the hook not blunt, but turned into a cutting surface by the insertion of a small piece of well-tempered steel blade into it. A transverse section of the curved or cutting portion of the instrument, and of its included knife-blade, is also shown in the woodcut. The entire length of the instrument which I have hitherto employed in my own practice is ten inches—the length of the wooden handle being four inches, and that of the metallic shaft six inches. A shorter instrument might, perhaps, suffice equally well. The cut represents the curved portion, or hook at the extremity, as somewhat wider and larger than in the

[1] Dr. Heming's Translation of Mad. Boivin's *Treatise on Diseases of the Uterus*, pp. 210, 211.

[2] When the texture of the polypus is too soft to allow, without tearing, of the mass being drawn downwards by vulsella, Lisfranc even advises the hooks of the forceps to be fixed in the cervix uteri itself, to get a sufficient hold for dragging down it, and the polypus with it, to the vulva.—*Gazette Médicale*, 1834, p. 149.

[3] Quia *secantia* instrumenta ægre in vaginam immitti possunt, ne partes vicinas lædent, et facile lethales hæmorrhagias gignant.—*Nissen De Polypis Uteri*, 1789, p. 34.

polyptome made for me in the first instance, and which I have generally employed in practice. Perhaps an increased or a diminished size and width, in the curved hook at the extremity of the instrument, would render the operation of division by it more easy, according as the stalk of the polypus is very thick, or comparatively slender. The extreme point of the instrument is blunt and rounded; and the cutting portion or blade is so protected and concealed by it, and by the back wall of the curve, that it can be introduced into and withdrawn from the vagina, without any chance of its edge injuring or dividing the vaginal structures themselves. To be always able to discover the direction to which its hooked extremity points after it is introduced into the vagina, the front aspect of the handle is distinguished by having a slight knob or other mark upon it.[1]

Fig. 28.

In employing this polyptome, the stalk of the polypus is first to be reached by the apex of the first finger of the right hand, introduced along the short anterior or pubic surface of the vagina; the instrument is then pushed by the left hand along this finger as a guide, and passed over or above the peduncle of the tumour, in such a direction that the concavity of the hook will come down upon and embrace this peduncle, as the instrument is pulled again downwards. The next step is to make the blade of the polypus-knife cut through the stalk of the tumour. For this purpose, a little simple traction, with a slight rolling or sawing motion, is all that is generally required. If the tissue of the peduncle is dense and strong, the dividing force of the instrument may be increased by the forefinger of one hand being applied with a tractive power to the blunt extremity of the instrument, while the handle is dragged down and moved in a sawing direction, by the other hand of the operator. Sometimes, when the polypus is round and loose, after the curve or hook is applied to its pedicle, the cutting portion of the polyptome will divide this stalk most readily, by merely doubling backwards with the fingers the body of the polypus upon its own stalk, and pulling the knife against the bent peduncle. In such a case, the

[1] The use of the polyptome was first proposed to the Obstetrical Society of Edinburgh at its meeting of June 25, 1851. See *Edinburgh Monthly Journal of Medical Science*, Nov. 1851, p. 492.

peduncle is divided as much by pressing it against the knife, as by pulling the knife through the peduncle.

During the last few years, I have removed a very considerable number of uterine polypi of different sizes, and some of them of large dimensions, with this curved polyptome; and I can now speak from somewhat extensive experience of the perfect facility and safety of its employment.

Sometimes soft and slender cellular and canaliculated polypi, usually of an elongated form, are met with in practice, which afford no sufficient resistance for a knife to divide them or their peduncles. In such cases, the peduncle of the polypus is, perhaps, most easily severed, by the careful clip of a pair of blunt-pointed, curved scissors. In all other forms of the disease, where the tumour was large and pedunculated, I have of late employed the polyptome. In using it, the patient is placed in bed, in the common position on the left side; and generally the whole operation is accomplished so readily and easily, that she is often not aware that more than a common digital examination has been made. I have several times seen more difficulty attend the removal of the amputated polypus itself from the vagina, after its stalk was divided, in consequence of the great size of the tumour; and in order to effect extraction, I have occasionally been obliged to transfix it with the teeth of a large vulsellum. But hitherto I have met with no special difficulty in at once and easily dividing the peduncles themselves of the polypi with this polypus-knife.

The whole operation is simple and safe, expeditious and painless, and approaches, perhaps, more than any other in practice, to the Asclepiadean character of the object of the physician: "*ut tuto, ut celeriter, ut jucunde curet.*"

In conclusion, let us compare and contrast, in a few points, the operation of the excision of a common or large-sized uterine polypus, by the method I have described, and its removal by the ordinary operation of deligation.

I. *Relative difficulty of the Excision and Deligation of Uterine Polypi.*

No practitioner can ever be perfectly certain that any large growth detected in the vagina is a uterine polypus, until his finger touches and traces the peduncle itself of the tumour. And wherever the finger can thus be made to pass and detect the

stalk of the polypus, the polyptome may certainly be guided to, and applied so as to divide that stalk. I refer here to cases of considerable difficulty, from the unusual shape or size of the polypus. In such instances, one cannot but conceive it easier

Fig. 29.

to pass upwards a solid curved instrument directly around the mere stalk of the tumour, than to pass a piece of whip-cord or other ligature *behind* and *over* the whole body and mass of the polypus itself, till, in being retracted, it comes indirectly and ultimately to embrace the stalk. For example; in Fig. 29, there is a sketch of a large uterine polypus, which I some time ago amputated with the polyptome. The figure represents the polypus diminished two-thirds—*a* marking the upper, and *b* the inferior extremity of the polypus, while *c* denotes the site and thickness of the peduncle of the tumour, as divided by the polyptome. In this instance the polypus is of an elongated form, its peduncle being attached to its middle, and not to its upper extremity. The tumour had evidently grown into this form after being expelled from the uterus into the vagina. It had developed upwards towards the roof of the vagina, as much or more than downwards. In this case, the peduncle of the tumour was readily caught and divided by the polyptome; but it would evidently have been a matter of great difficulty to have

passed a ligature over the back and top of such a polypus, so as to embrace with it the peduncle from above.

When, however, a polypus is smaller, round, or oblong, and its peduncle is attached to its upper part, there is not more difficulty in applying the ligature, than in applying the knife to the stalk of it. Some, however, of the practitioners who have had most experience with the ligature, confess to the occasional difficulty of its application with even the best kind of canula. "By practice and dexterity," says Dr. Burns, "this instrument (the double fixed canula) may doubtless be adequate to the object in view, but without these requisites the operator will be foiled—the ligature twisting, or going past the tumour; every attempt giving much uneasiness to the patient; and not unfrequently, after many trials and much irritation, the patient is left exhausted with fatigue, vexation, and loss of blood." This is very likely to happen if the polypus be so large as to fill the vagina. "Dr. Hunter," adds Dr. Burns, "after repeated trials, failed in a case where the polypus filled the vagina: the pedicle in the preparation is long, and as thick as the finger."[1] The application of a ligature to a large uterine polypus is, "in many cases," Dr. Hamilton[2] testifies, "one of the most difficult and dangerous operations in surgery;" and he tells us that "he has seen some of the most eminent practical surgeons of this part of the kingdom foiled in their endeavours to apply the ligature."

I quote, in preference, such opinions from the writings of Professors Burns and Hamilton, because both of these gentlemen were strongly in favour of the operation of deligation.

II.—*Relative Duration of the Operation of Deligation and Excision.*

The process of excision is generally accomplished in the course of two or three minutes at most, sometimes in a shorter period. On the contrary, the deligation of a uterine polypus consists of a succession of operations rather than of one; and is usually protracted through a period varying from two or three days to two or three weeks. The application itself of the ligature and canula, in the first instance, requires as much, or indeed more time and pains than the act of excision. But, after its first application, the ligature requires to be tightened and adjusted from time to time. "Twice a-day," as Dr. Gooch directs, "the ligature is to be untwisted from the

[1] Burns' *Principles of Midwifery*, p. 130.
[2] Hamilton's *Practical Observations*, p. 40.

shoulder of the canula, drawn tighter, and then fixed again round the projecting part; and this is to be done morning and night." "Every day," observes Sir Charles Clarke, another advocate, like Dr. Gooch, for this mode of treatment—"every day the practitioner is to examine the state of the ligature, and as often as it is found to be at all slack, it is to be tightened. The mode of tightening it," he continues, "requires particular attention. If the canula should happen to be long, the practitioner should not hold the end of it whilst he tightens the ligature, lest with the force used the ligature should cut through the neck of the tumour, and the other extremity of the canula should be suddenly and forcibly pushed against the internal parts of the woman. The time," he adds, "at which the ligature will come away will depend upon the thickness and firmness of the neck of the tumour, and the tightness with which the ligature is at first applied. The neck of the tumour sometimes is cut through in four days, sometimes ten or twelve days will elapse between the application of the ligature and the removal of the tumour, and occasionally the separation of the tumour will take up three weeks; but this is an uncommon occurrence."[1] "After an interval," observes Dr. Churchill, "varying from six days to three weeks, the canula will be found loose in the vagina, and the stalk of the polypus severed."[2]

III.—*Relative Care and Management after the two Operations.*

After the operation of excision, the only special treatment in general required is the introduction of a sufficient plug, of sponge or other soft material, into the vagina, to prevent the chance of bleeding; and the withdrawal of this plug after ten or twenty hours. After, however, the application of the ligature in deligation of a uterine polypus, a considerable amount of continuous care and caution is necessary up to the time at which the pedicle is ultimately divided. "The patient is," says Sir Charles Clarke, "to be desired to remain constantly upon her side, and should not be allowed to move from one side to another unless when the practitioner is present." For want of attention to this caution, there is," he adds, "reason to believe that the canula has been inadvertently pressed against, and its extremity pushed through the uterus of the patient, so as to occasion her death."[3] "The woman," as Dr. Ramsbotham

[1] *Observations on the Diseases of Females*, p. 263.
[2] *On the Diseases of Females*, p. 220. [3] *Observations*, etc., p. 262.

states, "will be obliged to keep her bed during the sloughing process; and she ought to be cautioned, upon attending to her natural calls, to beware of any accidental occurrence which might push the point of the instruments against the internal surface of the uterus."[1] "As the instrument," Dr. Gooch remarks, "projects out of the vagina, if the patient was, whilst turning from side to side, to sit down upon it, she might impale herself on it—an accident which I have heard once took place, and terminated fatally."[2]

IV.—*Relative chance of Local Irritation of the Vagina and Uterus.*

Local lesion and irritation of the vagina and cervix uteri are not liable to follow upon the practice of excision, unless some local injury has resulted in the operation from very incautious manipulation. But in addition to this danger, there are after deligation other sources of local disease in the sloughing and putrefaction of the polypus before its complete separation; in the presence of the very fetid and excoriating fluid with which the surface of the vagina and vulva is in consequence constantly bathed; and in the irritation by the ligature itself, as a foreign body, upon the constricted and ulcerating stalk of the tumour—not to speak of the constant application to this ulcerated surface of the foul and acrid discharges that issue from the dead and decomposing polypoid structure. The polypus usually swells after the first application of the ligature. "On account," observes Chelius, "of the increasing bulk of the polyp, it is generally necessary, for the first few days after deligation, to empty the bladder with the catheter, and the rectum by clysters. The symptoms," he further states, "which may occur after the tie has been made, are, violent inflammation and fever, pain, spasms, bleeding, and other symptoms, from the pressure of the swelling polyp. To prevent," he adds, "the effect of the stinking ichor, repeated injections of decoctions of aromatic herbs must be employed."[3] After the ligature is applied, "When putrefaction has commenced, the discharge from the vagina," to quote the words of Dr. Ramsbotham, "becomes fetid and *highly* offensive. . . It is, indeed, the best sign we can observe, as it proves that decay is going on, that the stem is sufficiently compressed to strangulate the vessels which nourished the diseased growth. If ever," he adds, "such a discharge

[1] Dr. John Ramsbotham's *Practical Observations*, vol. ii. p. 468.
[2] *On some of the most important Diseases peculiar to Woman*, p. 264.
[3] *System of Surgery*, South's Edition, vol. ii. p. 752.

did *not* take place in a day or two, I should be suspicious that the operation would not succeed."[1]

V.—*Relative danger of the two Operations to the Health and Life of the Patient.*

Those authors who have written in favour of deligation usually quote one solitary case of death from hemorrhage after excision, recorded by Zacutus Luzitanus, in the seventeenth century. It was an instance of the fact that the amount of attendant hemorrhage is not regulated by the mere size of the polypus; for in the case in question it is stated that the amputated polypus was not larger than an almond.[2] In this instance the operation was performed by an empiric, and no plug or other means for arresting the hemorrhage appear to have been employed. The patient died, not so much from the operation, as from neglect of all proper means to restrain the hemorrhage resulting from it. At the same time let me remark, in passing, that the operation of deligation itself is not free from the risk of hemorrhage, both from the abrasion of the surface of the tumour in working with the canula and ligature, and from the division of the vessels of the stalk, as they are cut through in the process of deligation. "I think," maintains Dr. Meigs of Philadelphia, "the ligature is to be preferred to all other modes of extirpation. It is not in every case to be effected without hemorrhage. I know," he adds, "of two cases here in which the hemorrhage was *terrible*."[3]

But the principal danger to health and life in this, as after other surgical operations, is the danger of phlebitis and surgical fever. Is such a consequence more liable to follow upon the instantaneous resection of the peduncle of a polypus, and the subsequent immediate removal of the amputated polypus itself—or is it more likely to supervene upon the slow process of disjunctive ulceration being set up in the stalk of the polypus by the ligature, while the gangrenous and putrefying polypus itself is left decomposing in the cavity of the vagina?

I believe that no physician or surgeon acquainted with modern pathology will have any difficulty in answering, that the danger of phlebitis is much greater under the latter circumstances than under

[1] *London Medical Gazette* for 1835, p. 435. [2] *Praxis Medica*, lib. ii. Obs. 86.

[3] Meigs' *Females and their Diseases*, p. 255. See also Examples in Colombat de l'Isère's *Traité des Maladies des Femmes*, p. 817.

the former. The recorded experience of some of those who have written in favour of the ligature, shows strongly enough the occasional liability under deligation to the occurrence of irritative fever and internal inflammations, from phlebitis and the absorption of putrid and purulent matter from the vagina. Dr. Hamilton[1] mentions three cases of death which he had seen follow the removal of uterine polypi by ligature. "On a close inquiry," observes Mr. Arnott, "I find that even those who use it (the ligature) acknowledge that occasionally cases have been met with, where the ligature, in cutting its way through, has excited irritation and fever, and even death. Two cases have been described to me by the practitioners concerned where this occurred, and in casually referring to the interesting works of Boivin and Dugès I find two similar ones."[2] In his lectures on fibrous tumours of the uterus, Dupuytren[3] states, "I possess eight or ten observations of women who have perished, from veritable poisoning and absorption of pus, after the application of the ligature for uterine polypus."

I have myself seen a woman die with a ligature still fixed around the partially divided neck of a uterine polypus; and other cases where severe but not fatal attacks of phlegmasia dolens and phlebitis followed deligation. Twelve or thirteen years ago, on a patient of Dr. Edgar's of Berwick, I applied a silver wire ligature to the neck of a large polypus, and tightened it from time to time, according to the usual rules. In the course of a few days the polypus was dead and putrefying; there was much heat and irritation in the vagina; and the patient's pulse became rapid under the irritative fever that followed. On strongly tightening the ligature, to expedite as much as possible the total amputation of the polypus, the wire broke, and the canula and wire slipped off. I immediately proceeded to remove the polypus by excision, instead of making any renewed attempt at deligation; and the result was to me very striking and satisfactory. Within twenty-four hours the local irritation had greatly subsided, and the constitutional disturbance entirely disappeared. From that time to this I have operated on many uterine polypi, but never again by the process of slow deligation. And the more that I have seen of the practice of removing

[1] Hamilton's *Pract. Observ.* p. 37.

[2] Arnott in *Lond. Med. Gazette*, 1836, p. 412. See also notices of two other cases of death from uterine phlebitis after deligation, in *Cyclopædia of Practical Medicine*, vol. iv. p. 393.

[3] *Leçons Orales.* Brussels ed. 1826, p. 237.

large pediculated uterine polypi by excision, the more deeply has the conviction grown upon my mind, that this method is very superior to the usual method followed in this country, of the removal of them by the canula and ligature.

ON THE DETECTION AND TREATMENT OF INTRA-UTERINE POLYPI.[1]

After a polypus, or pediculated tumour, arising from any part of the interior of the uterus, has once passed downwards into the vagina, the diagnosis of the disease is, generally speaking, very easy, the operation for its removal comparatively simple, and the result of the treatment in the highest degree successful and satisfactory.

But before a uterine polypus has passed through the os uteri—in other words, as long as it is still intra-uterine, or shut up and contained within the uterine cavity—the disease has hitherto been usually regarded and described as entirely beyond the reach of legitimate diagnosis and treatment. "It very frequently happens," observes Dupuytren, "that polypi concealed in the uterine cavity, inaccessible to our senses and instruments, give rise to severe symptoms, the true cause of which *cannot* be determined."[2] "When polypi," he again states, "are entirely included within the uterus, the rational symptoms afford room only for conjecture; and examination by the finger or speculum are both alike insufficient."[3] "So long," remarks Madame Boivin, "as the polypus is concealed within the uterus, all that can be ascertained is the increased size of that organ."[4] "If the polypus," says Dr. Ramsbotham, "be still included within the uterine cavity, and if the mouth of the organ be closely shut, it is impossible to reach it by the finger, and consequently quite out of our power to ascertain its presence."[5] "So long," according to Mende, "as a polypus is enclosed in the uterine cavity, its diagnosis is scarcely possible."[6] "True uterine polypi, while they remain enclosed in the uterine cavity, furnish," observe Roche and Sanson, "none but equivocal symptoms, which may be

[1] Extended from a Paper read before the Medico-Chirurgical Society of Edinburgh, November 21, 1849. See *Edinburgh Monthly Journal of Medical Science*, January 1850, p. 3.

[2] *Leçons Orales*, vol. iii. p. 542. [3] *Ibid.* p. 490.

[4] *Practical Treatise on Diseases of the Uterus.* Heming's Translation, p. 200.

[5] *Medical Gazette*, vol. xvi. p. 406. [6] *Krankheiten des Weibes*, p. 591.

confounded with those of pregnancy. These different symptoms may also depend on chronic inflammation of the womb; and it is often impossible to distinguish this affection from polypus. In the actual state of the science, there is but one case in which a certain diagnosis may be formed, viz. when, the neck being effaced, and partly opened, it is possible to feel the rounded tumour within."[1]

These, and other passages that might be cited, show that intra-uterine polypi are generally considered at the present day as placed beyond the pale of any certain means of detection, or any possible means of operative removal. And some of the older pathologists, indeed, would seem to have believed that there was no necessity for devising such means, inasmuch as, in their opinion, no danger was connected with the disease as long as the polypus remained intra-uterine. They held that the great source of prostration and peril attendant upon uterine polypi—namely, the hemorrhage or menorrhagia which accompanies them—is not liable to supervene till the polypus has passed through the os uteri. Levret, for instance, was of opinion that, as long as a polypus remained within the uterine cavity, there was no accompanying hemorrhage, and that floodings appeared only after the tumour had left the uterine cavity.[2]

Several years ago, I saw, with Dr. Alexander Wood, a case, the result of which was distressingly opposed to this doctrine.

Case I.—The patient was about fifty-five years of age, and unmarried. She had been suffering long under severe menorrhagia. The face was pale and anæmic, and her health and strength broken down. On examining, per vaginam, the os uteri was found closed; but the uterus felt somewhat large and distended; and Dr. Wood, believing, with me, that the hemorrhagic drain which was present might be the result of an intra-uterine polypus, the mechanical dilatation of the uterine cavity was advised, but given up in consequence of local treatment being objected to. In a few weeks the patient sank, under the continuance of the hemorrhage. On opening the body, Dr. Wood and I found the lower part of the cavity of the uterus distended by a polypus, of the size of a small plum, and attached to the back wall of the uterus by a narrow half-broken stalk. The lining membrane of the uterus was white and bloodless; but the polypus was red, from engorgement and effusion of blood in its tissues. Its structure was fibrous; and there was another small fibrous tumour imbedded in the walls of the uterus, near the uterine extremity of the right Fallopian tube. It had descended lower down than at the time we examined, so as to have already dilated the cavity of the cervix; and the os, at the time of death, had begun to open. It was evident that, if the cavity of the os and cervix could have been artificially dilated during life, the polypus would have come within reach, and the patient's life been saved.[3]

[1] *Nouveaux Elémens de Pathol. Méd. Chir.* tom. iii. p. 284.

[2] Levret, *Sur la Cure Radicale de Plusieurs Polypes de la Matrice*, p. 25, etc. etc.

[3] The uterus and its included polypus, from this patient, are in the University

I have seen several other cases of intra-uterine polypus, where the hemorrhage was both long in continuance and great in quantity. Some years ago, along with the late Dr. Henderson of Corstorphine, I excised a slender pendulous polypus, hanging from the os uteri, in a patient who, some time previously, had nearly died of exces-

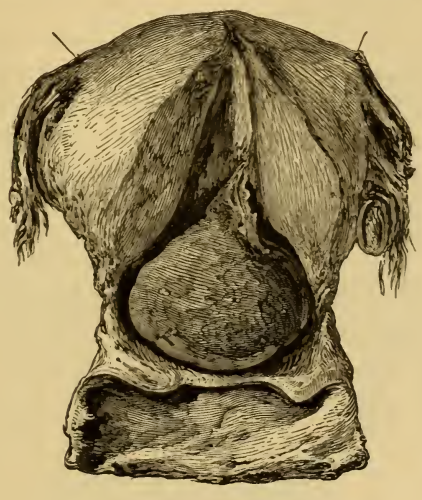

Fig. 30.

sive uterine hemorrhage of several days' duration, at Leamington; but at the period of that dangerous attack the attendant physicians had been unable to discover any uterine organic disease, to account for the discharge. The polypus had not yet passed the os uteri.[1]

When nature, in cases of intra-uterine polypi, begins to expel the tumour, and open up the os uteri, we may, at that stage, as stated in a preceding quotation from the work of Roche and Sanson, find it possible to make a diagnosis of the disease by being able to "*feel* the rounded tumour within." If art could furnish us with any means of producing, at will, the same extent of opening of the os

Fig. 30. Polypus fatal by continued hemorrhage, while still included in the uterine cavity.

Museum; and the above woodcut presents a faithful sketch of them, diminished two-thirds, made from the preparation, and showing the size and site of the polypus, its place and mode of attachment, and the slight dilatation of the os that had taken place before death.

[1] In this, and in one or two other instances in which I have seen extreme degrees of flooding attendant upon small polypi, the narrow elongated polypus was of a cellular structure internally, and externally spotted and roughened over by numerous small linear-placed elevations, like those on the shell of the echinus.

uteri, it would enable us in the same way to "*feel* the rounded tumour within" with our finger; and it is evident that, by this means, we would possess a power of detecting, with all the certainty of physical diagnosis, the existence or not of the disease within the cavity of the uterus, in cases in which the attendant rational symptoms—as the menorrhagia, uterine leucorrhœa, and perhaps the swelled state of the neck or body of the uterus—might lead us to conjecture the probable presence of an intra-uterine polypus.

In 1844, in a communication[1] laid before the Medico-Chirurgical Society of Edinburgh, I proposed a means of safely opening up the cavity of the cervix and body of the uterus, to such an extent as might enable us to introduce a finger into the uterine cavity, for the purposes of diagnosis and operation in this and other diseased states of the organ. The means described consisted in the introduction of sponge-tents into the os and cavity of the uterus, so as gradually to dilate these parts to the degree required. For several years past

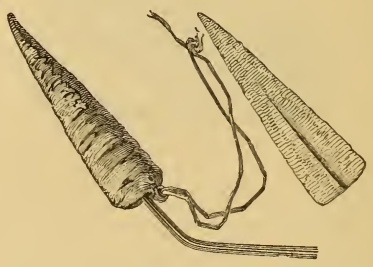

Fig. 31.

I have been constantly employing this means of dilatation of the uterine os and cavity, for a variety of purposes and indications. The sponge-tents used by myself and my professional brethren in Edinburgh are manufactured by Duncan, Flockhart, and Co. They are of a narrow conical or pyramidal form; and used of many different sizes and lengths, according to the object in view. One of nearly the medium size is represented in Fig. 31. These tents are made by dipping a piece of sponge in a strong solution of gum-arabic, tying and compressing this sponge around a central wire, as its axis, into the required conical form, by a continuous layer of whip-cord, drying it thoroughly, removing the cord, and subsequently slightly coating the surface of the tent with tallow, or axunge and

[1] "Mechanical Dilatation of the Cavity of the Os and Cervix of the uterus, as a means of Diagnosis and Treatment in some Affections of that Organ."—See abstract of it in the *Monthly Journal of Medical Science*, August 1844, p. 734.

wax, to facilitate its introduction. The central wire passes only for half-an-inch or an inch into the base of the cone (see section of one above); and the opening left by it serves as an aperture to transfix the tent with the tip of the metallic director (Figs. 31 and 32), used for guiding and introducing the tents through the os uteri. This metallic

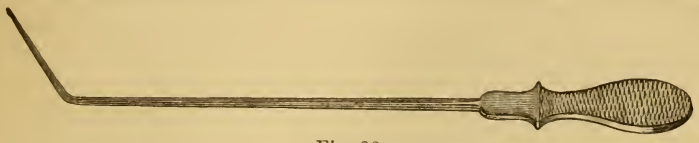

Fig. 32.

director, which, at the distance of nearly two inches from its extremity, is bent at an obtuse angle, thence tapering to a blunt point, is introduced like the uterine sound or the catheter; its handle, with the sponge affixed to it, is held and manipulated by the left hand, while the forefinger of the right hand touches the os uteri, in order to guide and direct the apex of the tent into that opening. The old forms of sponge-tent used by surgeons, and made of sponge steeped in preparations of wax, required for their expansion and development the aid of heat, in order to dissolve their retaining ingredient. The tent I have described, made by steeping sponge in a solution of gum, requires moisture, and not heat, for the solution of its retaining material, and for the expansion of the sponge. Very generally the secretions of the surrounding mucous canal afford a sufficient quantity of moisture for these two purposes; but if not, a small quantity of tepid water may be injected from time to time into the vagina. Usually a well-made tent takes twenty or thirty hours to expand to its full extent in the os uteri; and dilates to four or five times the diameter it presented in its original compressed state. Generally the first tent opens up the os and cavity of the cervix, and allows the finger ample space to examine sufficiently its contents, and the state of its parietes. If it is necessary to open the uterine cavity higher, to enable the finger to pass into the cavity of the body of the organ, a succession of tents is usually required; and they must be passed completely through the os internum or narrow portion, lying between the cavity of the cervix and cavity of the body of the organ. The use of the tent for a day, generally, as I have already stated, dilates the os uteri and cavity of the cervix sufficiently; and the employment of the sponge is accompanied with little or no feeling of uneasiness. When it is necessary to examine the state and conditions of the interior of the cavity of the body of the organ, the persevering use of a series of

larger and larger tents for several days is usually requisite ; and the dilatation of the os internum and body of the organ sometimes, but not always, causes a feeling of uneasiness and pain, that may require the use of an opiate. I have omitted to state that the tent is always prepared with a string affixed to its base, to allow of its easy removal. (See Fig. 31.) In using sponge-tents, it should be remembered that, when sponge is in contact with the maternal passages for some hours, it always exhales, when removed, a very fetid odour.

For dilatation of the unimpregnated os uteri, the tent should be selected as regularly conical as possible ; and with the apex neither too blunt and rounded to pass the os, nor too slender and flexible, so as to double back in the attempt. The spirally-grooved surface of the tent, resulting from the compression of it by the whip-cord during its manufacture, tends to retain it *in situ* till its expansion commences. It perhaps ought to be added, that the introduction of the sponge-tent into the os and cavity of the uterus should be effected without the use of the speculum. The sense of touch serves, in this and some other analogous operations, infinitely better than the sense of sight.

By the use of sponge-tents introduced daily, and of increasing size and length, we may reach a polypus when affixed and sessile even upon the fundus uteri. One of the first cases in which I dilated the uterine cavity to its extreme height was the following:—

Case II.—In 1844, a patient, æt. thirty-six, under the care of Dr. Graham of Dalkeith, had a miscarriage, from the effects of which she never satisfactorily recovered. Previously she had borne four children. When I first saw her, two or three years afterwards, she was emaciated and extremely pallid from the excessive loss of blood which she had been sustaining for some time ; and her weakness was such, that it was with difficulty she could rise and walk across her bedroom. In August 1847 I dilated fully the interior of the cervix and body of the uterus by a succession of sponge-tents, and at last felt a hard round fibrous polypus seated at the very fundus of the uterus, and projecting, of the size of a walnut, into the upper part of the cavity of the organ. Dr. Ziegler, Dr. Toogood of Torquay, and other professional friends, confirmed this diagnosis. It was impossible to ascertain how it was pediculated, or to operate upon the pedicle. We could only reach the round body of the tumour ; and that I compressed strongly and repeatedly in the blades of a lithotomy forceps, with the view of breaking down its tissue, so as to destroy the vitality of the polypus. A purulent discharge followed, and three largish pieces of organised structure were subsequently cast off. Her recovery of health, after these discharges ceased, was gradual but perfect. There has been no return of menorrhagia. About a year ago she called upon me, and the change from excessive pallor and emaciation of the face, to the hue and ruddiness of health, was so great, that I had difficulty in being convinced of the identity of my former patient.

The *Symptoms* which might, *a priori*, induce a practitioner to

conjecture the probable existence of an intra-uterine polypus, are, as we have seen in the quotations I have already given, of a very uncertain and equivocal character. The polypus, while still included within the uterus, is principally liable to give rise to the following groups of symptoms :—

1*st.* Menorrhagia, in consequence of the discharge of blood from the surface of the tumour. The attendant hemorrhages take place particularly at the menstrual periods, but are apt to recur also at other times ; and the blood is sometimes fluid, sometimes coagulated ; occasionally there is an almost constant red stained discharge. The effects of these repeated floodings upon the constitution of the patient vary with their amount ; but if they go on increasing, as they usually do, in quantity and frequency, the patient's constitution becomes gradually more and more shattered and broken down by the amount of hemorrhagic discharge ; and all the symptoms of anæmia, in their most marked degree, at last supervene, as pallor of the face and lips, great muscular debility, vertigo, palpitation, dyspepsia, œdema, etc.

2*dly.* The discharge of mucous, purulent, or serous matter from the cavity of the uterus in consequence of the mucous membrane of the organ becoming often irritated, inflamed, and even ulcerated, by the presence and pressure of the polypus. If a severe leucorrhœal discharge is present, and we ascertain by the speculum that it does *not* originate in ulceration or other morbid state of the external surface of the cervix, or of the vagina ; and if we further detect, with the speculum, the discharge issuing from the cavity itself of the uterus, the probabilities of it originating in some pathological irritation within the uterus will be necessarily increased. Sometimes the discharge, in cases of polypi, is fetid, especially if it be retained, or mixed with decomposing blood.

3*dly.* Increased size of the cervix and body of the uterus, in consequence of its interior being distended by the presence of the polypus, is traceable in those cases in which the polypus is of any great size. Not unfrequently intra-uterine, like vaginal polypi, are found combined with the presence of fibrous tumours in the walls of the uterus ; and by these tumours the magnitude of the organ is increased, and its shape rendered more or less irregular. Fibrous tumours of the uterus are seldom or never situated in the walls of the cervix ; and if the swelling and distension affect the cervix, there is consequently much more chance of its being a polypus and not an interstitial fibrous tumour, than when we have similar symp-

toms attendant upon a similarly augmented state of the body of the organ. Further, the probability of the disease being intra-uterine polypus would be increased, if, on successive examinations, we had an opportunity of ascertaining that the enlarged and distended state of the cervix was descending gradually lower and lower down towards the os ; for polypi in their progress and descent, as seen in Case I., gradually dilate the cervix from above downwards in the same way as happens in pregnancy or abortion. They are born by a kind of chronic labour.

4*thly.* There may be symptoms of irritation and pressure upon the bladder, rectum, etc., if the polypus happen to be so large as to exert mechanical compression upon these or other parts, or dysmenorrhœa if it fills up the cavity of the cervix. And sympathetic pains may be present in the loins, limbs, etc. ; or there may be sympathetic disturbance of the stomach, heart, etc., if the uterus is much irritated and excited by the presence and distension of the polypus.

But one or more of the preceding groups of symptoms may be altogether absent, though the uterus contain an intra-uterine polypus. The mechanical and sympathetic symptoms last alluded to are the most uncertain of all. For while almost all uterine diseases, however intrinsically different, give rise to similar secondary and sympathetic symptoms, we have often, in other instances of the very same diseases, these same symptoms entirely wanting ; just as in one woman during pregnancy we sometimes see severe, even serious, local, and constitutional symptoms ; and in another woman, or even in the same woman in another pregnancy, we see the same condition of the uterus unattended by any special local or constitutional disturbance. Again, there may be no ascertainable increased volume of the uterus, as the polypus, especially if it is vesicular, and originates in the interior of the cervix, may be far too small to lead to any appreciable augmentation in the size of the organ, although, notwithstanding, the menorrhagia may be great ; for the extent of flooding does not depend on the size of the polypus—small polypi, like small hemorrhoidal excrescences, often being the source of severe and repeated hemorrhages. Further, the leucorrhœal discharge, which is sometimes attendant, may be entirely absent, as the polypus may not be irritating the mucous surface of the cavity in which it is inclosed. And lastly polypi occasionally, though not very frequently, are present for a long series of years without producing any degree of hemorrhage or menorrhagia. In the following case,

for example, there was a state of long-standing amenorrhœa, instead of menorrhagia, co-existent with the presence of a polypus, though the two conditions, the amenorrhœa and polypus, had probably no causal relation to each other.

Case III.—A poor woman, from East Lothian, aged about 35, and of a weak and debilitated frame, came, some three or four years ago, to ask for advice regarding the state of her health. She described her case as one of long-standing amenorrhœa. For five or six years the catamenia had been entirely absent; and she ascribed her broken health to this cause. On examining the uterus and ovaries, in order to ascertain if there was any organic change to account for the amenorrhœa, I found, with the uterine bougie, the cavity of the os and cervix uteri very small, and the latter apparently obstructed, about three-quarters of an inch from the orifice. I introduced a long thin sponge-tent, with the view of determining more correctly the state of the cervical cavity. On removing the sponge, two days subsequently, I found the lower part of the cervix natural, but a flattened polypus, of the size of a small cherry, attached by a short pedicle to the interior of the higher portion of the cervical cavity. The pedicle was easily seized with a pair of long slender polypus forceps, and separated by torsion or avulsion. For some time subsequently to this little operation, menstruation recurred—the irritation of the sponge-tent having probably so far roused the uterus to a restoration of its secreting functions; but a patient, from the same neighbourhood, about half-a-year ago, informed me that her health had relapsed again into its former unsatisfactory state.

The polypus, in the preceding case, was intra-uterine. During the past autumn I removed a uterine polypus, which had long passed down into the vagina, and yet had never given rise to menorrhagia.

Case IV.—The patient, 55 years of age, had, for at least twenty-five years, been aware of the occasional protrusion, between the labia, of a portion of what she supposed a fold of thickened and insensible skin. When she first noticed it, she had called the attention of her medical attendant to it, an eminent London obstetrician, under whose kind care she was for many years placed. He examined the tumour and its relations; but advised her to let it alone. Two or three years ago a little sanious discharge began to appear, and continued to recur almost daily. On examining the projecting body, I found it an elongated polypus, of the size and figure of the fruit of the date, and depending by a long slender stalk, which passed upwards through the os uteri. I divided the stalk with a pair of blunt-pointed scissors, immediately below the os uteri, and in four days afterwards the patient set off on a long journey. The polypus was of a dense cellular structure. At one point, near its fundus, its surface was ulcerated. The ulcer was of about the size of a sixpence, and, no doubt, the source of the discharge that had latterly appeared. Perhaps the removal of this polypus, when it was first discovered, would have enabled the patient to become a mother, and saved from extinction one of the highest and oldest titles in the kingdom.

Cases, however, like the above, of uterine polypi, of long duration, without attendant hemorrhage, are exceptions, and not very

common exceptions, to the general rule. And certainly the existence and return of attacks of menorrhagia, draining and undermining the powers of the constitution — without the presence of any ascertainable organic disease in the vagina, or around the os uteri, to account for the floodings, and the persistence of this discharge, in despite of all constitutional care and treatment—forms always the most frequent and principal symptom that would induce the practitioner to use means to ascertain if there existed an intra-uterine polypus, or any other intra-uterine lesion, that was the probable source of the hemorrhage. He would, *a priori*, have more expectations of detecting, in his investigation, an intra-uterine polypus, provided, along with the menorrhagia, there was an occasional leucorrhœal or sanious discharge, coming—as proved by the speculum —from the cavity itself of the uterus, and not from the surface of the cervix; and provided also there was an increased size or misshapen state of the cervix or body of the uterus, such as might result from the inclosure and distension of a polypus.

To convert, however, the probability derivable from such symptoms into a certainty, we must endeavour to read the true value of these rational symptoms by obtaining access to the cavity of the uterus itself, and ascertaining, by a digital examination, if a polypus be present in that cavity or not, or if there be any other co-existent uterine lesion, capable of accounting for the symptoms. It is becoming every day more and more acknowledged, that we can alone discover uterine diseases, and discriminate them from each other, by appealing in this way to the evidence of physical diagnosis. And no remark could be, pathologically and practically speaking, more sound and true than that which Sir Charles Clarke many years ago made :—"The true character of any disease of the internal female organs can *only* be ascertained by examination."[1] With this view, in order to enable the finger to reach and examine the cavity of the uterus, the os and cervix must be opened up by a succession of sponge-tents in the way already described. When an adequate degree of dilatation is obtained, the finger will be enabled to touch the tip of the polypus; and then the pediculated or polypous character of the tumour may be farther made out by passing either the finger or a uterine sound between its body and the containing cavity of the uterus. In making this examination, as in making most other examinations of the uterus, a rule requires to be followed which is too often forgot, namely, to use both hands for the purpose.

[1] *Diseases of Females*, vol. i. p. 250.

For if we are examining the uterus internally with the forefinger, or fingers of the right hand, the facility and precision of this examination will be found to be immensely promoted by placing the left hand externally over the hypogastric region, so as to enable us by it to steady, or depress, or otherwise operate upon, the fundus uteri. The external hand greatly assists the operations of that which is introduced internally; and farther, we can generally measure, between them, the size, relations, etc., of the included uterus.

If without, or before, using sponge-tents, we are desirous to examine at the time when the os uteri is naturally most relaxed, we shall find that time to be either immediately after a menstrual discharge, or immediately subsequent to any severe attack of intercurrent hemorrhage. Under such circumstances, we can sometimes introduce the finger partially into the os uteri, and ascertain the presence of any morbid body in the lower segment of the cervix; when in the same patient, at other times, this orifice is so completely shut as to prevent entirely such a proceeding. Sometimes, indeed, a small or elongated intra-uterine polypus will pass through the os uteri at these times, so as to be felt by the usual vaginal examination, but it will become retracted into the cavity of the cervix during the interval between the hemorrhagic discharges. In the following case[1] this occurrence was observed:—

Case V.—About eight years ago, I occasionally saw a patient who suffered much from leucorrhœa and menorrhagia. At last her health became so much broken in consequence of these discharges, and the pallor of the face and lips, and other symptoms of anæmia, so alarmed the patient, that she agreed reluctantly to submit to a vaginal examination. She had an objection, however, to me, on the score of youth; and the late Dr. Beilby was so good as to make the examination, and found a polypus, of the size of an almond, projecting from the lips of the os uteri. On Dr. Beilby returning, two or three days subsequently, to put a ligature around the neck of the polypus, none could be found, and the os uteri was shut. The other symptoms, however, did not change; and, on the recurrence of a new hemorrhage, Dr. Beilby made another examination, again found the polypus protruding, ligatured, and removed it.

In this instance, as in many others, the passage of the polypus through the os uteri did not produce any appreciable degree of pain. In enumerating the symptoms of intra-uterine polypus, I have omitted to state that, like polypi which have passed through the os uteri, they very rarely are attended with feelings of pain; and too often, both by the patient and the practitioner, the absence of pain

[1] See notice of an analogous case, by Dr. Ramsbotham, in the *Medical Gazette* for 1835, p. 406.

is erroneously supposed to be a proof of the absence of organic disease. Sometimes, however, as they are pressing upon the lower part of the cervix and os uteri, or distending and passing through these parts, uterine contractions and pains temporarily supervene, similar to those of miscarriage ; and, if there is any difficulty in the passage of the tumour, these pains may become exceedingly severe. In a case in which a fibrous tumour of the uterus had undergone the calcareous degeneration, and part of it had assumed a semi-pediculated or polypous form, the recurrent pains, when the mass came down upon the os uteri, appeared at times as extreme as those of the last stage of labour.

Case VI.—The patient, now 69 years of age, the mother of several children, had for several years suffered from recurring slight attacks of uterine hemorrhage. In February 1848, I saw her with Dr. Hunter. The os uteri was drawn up so high, that it was with great difficulty I could reach and touch it ; the top of the vagina stretched up in the form of an inverted funnel, the apex being placed at its upper or narrow extremity, and hence it was impossible to introduce or use a speculum. At the same time, the abdominal parietes were so thick and full, that it was impracticable to ascertain in any way the state of the uterus by an external examination. Not feeling a polypus, however, I left with the idea that the cause of the menorrhagia was some form of carcinomatous disease of the uterus. Subsequently, in the month of July, all her symptoms became aggravated, and very severe bearing-down pains were superadded. These pains recurred regularly once a-day, lasted in paroxysms for several long hours, and always left the patient weakened and prostrated. In consequence of their persistence, Dr. Hunter made another examination of the vagina, and found the os uteri, which was now pressed lower down, filled with an apparently irregular bony mass. I saw her again, and removed the calcareous mass, filling up the os uteri, with a portion also of fibro-calcareous tumour, which we found above it, and distending the lower part of the cervix. The irregular calcareous portion protruded through the os uteri, was about the size of a hazel-nut, and the portion of fibro-calcareous tumour above it nearly four times that volume. The daily fearful pain which the patient had been lately enduring immediately ceased, and everything looked so favourable that we had every hope that the whole of the fibro-calcareous tumour, or polypus, had been removed. Last February, however, after some unusual exertion, the pains again recurred more severely, if possible, than before ; and with this difference, that the attacks of them were now twice a-day, instead of being only once, as on the first occasion. Opiates and sedatives had little or no effect towards their alleviation. On examining the os uteri, no new foreign body could be found anywhere within reach. As the patient's strength and spirits, however, were rapidly giving way, I dilated the os fully, by a succession of sponge-tents, and found the cavity of the cervix occupied by another fibro-calcareous mass, larger than the first. After an ineffectual attempt to break it down and remove it, by strong lithotomy and other forceps, I dilated the os still farther with tents, with the view of, if possible, getting two or three fingers up to seize the tumour, and assist in its detritus and extraction. To allow the hand to pass into the vagina for this object, I was obliged to incise its orifice ; and, after no small difficulty, I was enabled to break off, by the fingers and forceps,

four or five fibro-calcareous pieces from the mass in the cervix; and these pieces, when afterwards conjoined together, were found to form a roundish semi-pediculated tumour, of the size of an orange. In order to enable her to sustain the pain of these proceedings, the patient was kept, during this tedious operation, under the influence of chloroform. The pains again ceased from the date of the removal of this second intra-uterine tumour; and under the kind care of her son, himself a physician, our patient made a good and steady recovery, and her health was restored by spending some of the autumn in the country. There still, however, remains in the uterine parietes some fibro-calcareous structure, as I lately ascertained by passing a uterine bougie into the elongated cavity of the uterus, and striking it against its hard stony surface.

The *Treatment* of intra-uterine polypi requires to be varied according to different circumstances, but particularly by the tendency or probability of the tumour passing downwards or not through the os; by the effects of the symptoms or the urgency of the case; and by the size and site of the polypus.

Two plans of procedure may be followed according to the nature and necessities of the case—viz. first to wait till the polypus descends farther; or, secondly, to remove it immediately. It is a generally acknowledged principle in obstetric surgery, that a polypus of the uterus should be extirpated as early after its discovery as possible.[1] But when such a tumour is discovered still included within the uterine cavity, and the polypus seems gradually but certainly making its way downwards through the cervical cavity, and the hemorrhage and other symptoms are not urgent, it will assuredly be better to wait for its descent through the os; for after that its removal becomes much more easy and simple. The dilatation of the os and cervix by the sponge-tents will promote and facilitate its descent; and perhaps the internal use of the ergot of rye may aid it. But the degree of attendant hemorrhage and debility may be too great to entitle us to postpone the removal of the polypus; or the tumour may be attached by such a short pedicle as not to be capable of leaving the uterine cavity without dragging down with it, or invert-

[1] "In the treatment of this disease (uterine polypus) the first principle, undisputed, I suppose, by those who are possessed of experience in the management of these morbid growths, is, that it ought by all means to be extirpated; for unless it be removed, it will continue to grow larger and larger, till it utterly wears out life, and this especially if it be shooting from the upper part of the uterus, or even from the neck. It is, moreover, of vast importance in polypus, not only that it should be extirpated, but that this extirpation should be accomplished as early as possible. Lay this down, then, as a most important part of your practice, that polypi are not only to be taken away, but that they are to be extirpated early, as soon as they are discovered, and as soon as it is practicable."—Blundell's *Observations on Diseases of Women*, p. 126.

ing, the fundus or some part of the parietes of the uterus ;[1] or it may be retained in its descent by adhesions formed between the surface of the uterus and the surface of the polypus. I once witnessed the dissection of a case of large fibrous polypus included in the cavity of the uterus, and where inflammation had been present before death ; the surface of the polypus was adherent to the surface of the uterus through the medium of a recently-effused false membrane.[2] Even when an intra-uterine polypus has descended so far as even partially to open up the os uteri, it may remain in that situation for such a length of time, and with such results, as to place the patient in no small degree of danger. I shall quote, in illustration of this remark, an interesting case reported by Dr. Meigs of Philadelphia, in his work on *Female Diseases*. Dr. Meigs,[3] who quotes Dr. Lee, to the effect, that "it would be folly to attempt the removal" of a polypus still retained in utero, details the case referred to in the following words :—

Case VII.—"Some months ago a lady came to me from New Jersey. She had been for some years labouring under a uterine disease, accompanied with violent and exhausting floodings. Upon arriving here, she was wholly unable to walk or sit up in her chair. I discovered a hard polypus, whose apex was lying just within the os uteri, which was a circular opening as large as a half-dollar. The os uteri was pretty low down in the pelvis, it was very hard, and completely undilatable. The fundus uteri was half-way up to the umbilicus, and the uterus hard and solid, so as to allow me to trace its outlines very clearly in my hypogastric palpation. I assure you I have rarely met with a more extreme case of anæmia than in this person. This anæmia was evinced not only in the pallor of her surface, and its flabbiness, and in her irregular breathing, the frequent palpitation of the heart, and the anæmiacal throb of her pulses, but in the state of all her innervations, which were most miserable indeed, except when lying profoundly still in a low recumbency.

"After a few days' refreshment from the journey, I attempted to do what I thought I should fail to do—namely, to get a ligature on the tumour. But I soon found how vain was such an attempt, for I never found the uterus a moment relax, nor open beyond the size of a half-dollar. My attempt caused an attack of hemorrhage to come on, that I was glad to suppress by cold, by rest, and by opium.

"I kept her here many months, in hopes of seeing the uterus enter into powerful contractions to throw off the morbid mass. I gave her large doses of ergot. I thought the ergotism that was produced might expel the polypus, but I was disappointed, and subsequently had reason to believe the tumour had formed

[1] Cases of intra-uterine and vaginal polypi tending thus to invert the uterus at the site of the pedicles are detailed by Denman, *Introduction to Midwifery*, p. 106 ; Davis, *Obstetric Medicine*, p. 618 ; Dr. Oldham, *Guy's Hospital Reports*, New Series, vol. ii. p. 105 ; Scoutetten, *Gazette Médicale* for August 1839 ; Crosse, *Transactions of Provincial Medical Association* for 1845, p. 321, etc.

[2] *Library of Medicine*, vol. iv. p. 335.

[3] *Females and their Diseases*, p. 255. Philadelphia, 1848.

strong attachments to the inside of the uterine walls, so low down, that I could reach them with my finger, but could not break them up.[1]

"During her residence here, I thought to see her bleed to death before my eyes; her life was hardly saved by the tampon, so perverse was the hemorrhage. At length I sent her home, with directions as to her health, and a request to be informed if the tumour descended into the vagina. It will never descend into the vagina, if the adhesions I supposed to exist are truly there."

But, secondly, the severity of the attendant hemorrhages, or the improbabilities of the speedy and entire descent of the intra-uterine polypus, may induce us to remove the tumour at once; and certainly this may be effected in most cases, though with greater difficulties than in cases where the polypus has passed down into the vagina. To admit at all of the removal of an intra-uterine polypus of any considerable size, the os uteri must be previously very fully dilated by sponge-tents; and perhaps it will sometimes be found necessary, at the time of operating, to gain additional freedom, by dividing any obstructing band of the os or cervix that may not have been fully dilated by the tents. Afterwards, we shall require to proceed differently in different cases, in order to destroy or remove the polypus. We may only be able to accomplish this object by contusing and crushing the tumour, as I have described in a case already detailed. See Case II. In the instance in question, I grasped the polypus, for this purpose, with strong lithotomy forceps. In another similar case, after fully dilating the os and cervix, I seized a large intra-uterine polypus between the jaws of a screw-propelled lithotripsy instrument—invented for the purpose of crushing vesical calculi—and was enabled, by it, to crush and destroy readily the structure and vitality of the included tumour. Occasionally, we may be enabled to divide the stalk of the polypus with a silver wire or ligature, acting on the principle of the chain-saw; or we may reach it with very curved blunt-pointed scissors. The two following cases may serve to illustrate these two last-mentioned methods of operating:—

Case VIII.—A patient, æt. 36, about three years ago began to suffer under menorrhagia and dysmenorrhœa. The catamenia became both too frequent in their return, as well as much too great in quantity; but there was little or no leucorrhœal discharge. Latterly coagula of blood accompanied the menstrual periods, and the patient felt much weakened by each attack. The dysmenorrhœa generally supervened on the second day of menstruation, and confined the patient for

[1] The use of the uterine bougie would probably have determined this point; or the mechanical dilatation of the os by tents would have enabled the finger fully to reach and break the adhesions.

a couple of days, the third day being usually one of much sickness as well as pain, particularly if the patient tried to assume the erect posture. I first saw this lady in July of the present year, and found the uterus somewhat enlarged, and externally irregular in form, from the presence of one or two small fibrous tumours in its body and fundus. But the os uteri was shut, and I could not ascertain if the debilitating hemorrhage was the result merely of the irritation of these tumours in the parietes of the uterus; or whether one of them, forming a polypus in the cavity of the organ, was its source. I wrote her medical attendant to dilate the os in order to determine this point; and she returned home to England. In September she came back to Edinburgh; but, in consequence of the state of her health, I did not venture to dilate fully the os and uterine cavity till towards the end of October. On doing so, I was enabled to detect the rounded extremity of a polypus hanging down into the cervical cavity. During two or three days it descended somewhat lower, but ultimately remained fixed and stationary above and within the os. I found I could not move it farther downwards by fixing a vulsellum into it, and applying some dragging force. On the 6th November, assisted by Dr. Duncan, I applied a silver wire above the body, and around the neck of the tumour, by means of an instrument presently to be described. After the instrument was fixed and adjusted, a few turns of the screw made the wire cut through the pedicle of the polypus, and without any pain or suffering on the part of the patient. The separated tumour was then pulled by the vulsellum through the os uteri. The polypus was of the size and shape of a plum, with a small portion of the pedicle attached. It was fibrous in its internal structure. The patient's recovery was slow, but uninterrupted. She has menstruated once since the operation, but without the discharge being excessive, as formerly, either in quantity or duration (it lasted only three days); and also without her former distressing dysmenorrhœal pains.

The instrument employed in the preceding case was a modification of one kindly sent to me by my friend Dr. Sabine, of New York. I am told it has been successfully used by various American practitioners for the removal of polypi in the vagina. The advantage which it possesses over the instruments of Niessens, Gooch, Davis, and others, in the removal of intra-uterine polypi, is, that the screw-power with which it is furnished enables us to use it with the power of a small chain-saw, for the immediate division of the pedicles of the polypi. And it is almost superfluous to observe, that if we can finish our operation at once, it will be much safer for our patient than leaving a rough instrument within the cavity of the uterus. The instrument itself consists of two parts, viz. two hollow canulæ, like those pertaining to the instruments of Niessens and Gooch; and of a second part, resembling the polypus instrument of Graefe of Berlin, with this difference, that it has a ring affixed to its top, of a heart-shaped figure, and intended, first, to receive the two canulæ, with their contained ligatures, and afterwards to serve as a point of resistance during the cutting action of the ligature upon the pedicle of the tumour. The canulæ and

ligatures are first applied in the same way, and according to the same rules, as those of Niessens and Gooch. After the pedicle is encircled by the ligature, the two lower extremities of the canulæ and included ligatures are passed through the ring of the second portion of the instrument. This second portion of the instrument is then run up, with its ring surrounding the included canulæ, till it reaches the pedicle of the tumour; the projecting side of the ring being turned towards the pedicle. The canulæ are then slipped off and withdrawn, leaving the wires or ligatures alone in the terminal ring of the instrument. Subsequently, these wires are twisted around, and fixed upon, the knob attached to the screw. Lastly, by moving the knob downwards, by the operation of the screw, the ligature is made to cut into and through the pedicle.

In the following case, I was enabled to divide the pedicle of a large intra-uterine polypus with a pair of well curved blunt-pointed scissors.

Case IX.—The patient was 48, and unmarried. About fourteen years ago she was first seized, when in service, with a severe flooding. It returned at short intervals, and reduced her strength so much that she was obliged to leave her situation, and has never been able to take another. The hemorrhage she describes as having been almost constant for many years; that is, there was always some red oozing, and fluid blood and clots often escaped when she made any exertion. She had been treated by various medical gentlemen during this period, chiefly with iron, styptics, and astringents. A vaginal examination had never been made, in order to ascertain the source of the hemorrhage. During last autumn she presented herself for advice at my house. She was blanched, thin, and debilitated, and scarcely able to walk. On examination per vaginam, the uterus felt enlarged, more particularly in its cervical region. A sponge-tent was introduced, and on her returning, two days afterwards, I found a polypus descended upon the distended os. Dr. Ziegler, Mr. Carmichael, and Dr. Duncan, were present at the removal of the polypus. In order to reach, if possible, with the scissors, the pedicle of the polypus, I required to make a slight incision into the thin lips of the os. I was enabled at last, after some difficulty, and by seizing the polypus with a vulsellum on one of its sides, to turn the polypus laterally, and obtain access, with the scissors, to its pedicle, which was small and easily divided. After the polypus was completely separated, it took no inconsiderable amount of traction to drag it through the os uteri. The polypus was round, of the size of a small orange, and of a fibrous structure. The patient was rendered anæsthetic during the operation. The vagina was plugged with sponge, and the woman sent home. Next day the plug was removed. The patient has ever since kept free from any return of the flooding, and a degree of leucorrhœa, which followed, as often happens, the removal of polypi, is subsiding under the use of medicated pessaries. A month subsequent to the operation, she stated her strength to be greatly improved beyond what it had been for many years.

The preceding remarks, relative to the treatment of intra-uterine

polypi, principally refer to these tumours when they happen to be of a large size. But uterine polypi are often *too small* to be removed by the knife, scissors, or ligatures; and yet these small polypi not unfrequently lead to severe and long-continued menorrhagia. From the analogy of hemorrhoidal tumours, we know that the mere size of a polypus is not to be taken as any measure of its capability of producing hemorrhage. Small vesicular, mucous, or cellular polypi sometimes grow from the fundus uteri, giving rise to considerable and long-continued hemorrhagic discharge. I have preserved specimens of them from the dead subject, and have met with them in the living. They can hardly be properly termed polypi, as they are scarcely pediculated at their attachment, and sometimes short, but in other cases long and slender, in their body.

The following case may be cited as an illustration of this form of the disease:—

Case X.—A lady, the mother of ten children, became irregular in her menstrual discharge during her 44th year. At times it was wanting at the usual monthly periods, at others it amounted to menorrhagia. About a year after this irregularity commenced, such an amount of fluid blood and coagula escaped as at first to lead on her part to some suspicion of miscarriage; but it continued to go on profusely for two or three weeks. At the end of that time I visited her, with Mr. B. Bell and Dr. Malcolm. On examining the uterus, we found a small vesicular polypus attached to the inner surface of one of the lips of the os, and it was easily removed by avulsion. The discharge, however, was not abated in consequence, as we expected. A series of sponge-tents was then introduced, so as to open up, first, the cavity of the cervix, which was found free from additional polypi, and ultimately the cavity of the body of the uterus. When the distension of the whole uterine cavity was at last completely effected, both Dr. Malcolm and myself found that we could touch two or three small slender polypoid bodies, hanging from the very fundus of the uterus. I removed them cautiously, from the surface to which they were attached, with the nail of the first finger. After this the hemorrhage ceased, but some local treatment was required to cure the ulcerated state of the cervix. The polypi were removed in April. The patient went soon afterwards to spend the summer in the country, where she soon gained strength, and enjoyed much improved health. I saw her lately. The menorrhagia had not recurred, but she still looked anæmic, having never recovered her colour since the hemorrhages in spring.

Dr. Malcolm informs me that, since meeting with the above case, he has seen another similar one, and treated it successfully in the same way. I may add, that in several cases of chronic and severe menorrhagia, in which I have been induced to open up the cavity of the uterus with sponge-tents, in order to ascertain whether there was any small intra-uterine polypus present or not, I have merely found the interior of the uterine cavity rough and granulated at particular points, which I have generally tried to remove and scratch

off with the nail. Whether owing to their removal or not, or owing to the irritation resulting from the pressure and distension of the sponge, I know not, but certainly, in two or three cases, the menorrhagia has subsequently abated and ceased.

By far, however, the most common site for the origin of small vesicular polypi, is the interior of the cervix uteri. In fact, the

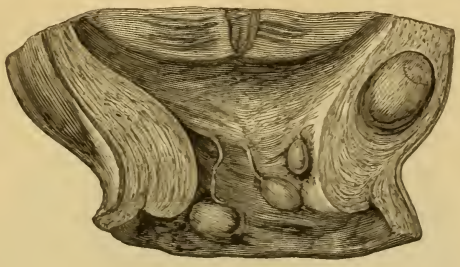

Fig. 33.

small cellular or vesicular form of cervical polypus is infinitely the most common form of polypous disease of the uterus. Several specimens of them are represented in the woodcuts. These cervical

Fig. 34.

vesicular polypi are generally of a small size, like a pea or orange-pip, and vary from this size to the size of a hazel-nut. Sometimes they are sessile; and sometimes pediculated, as represented in the sketch from Cruveilhier (Fig. 33). Occasionally they are single (Fig. 34), or they form a single complex cluster; but more frequently they are gregarious, as represented in Madame Boivin's

Fig. 33. From Cruveilhier's plates of Pathological Anatomy, fasc. xiii. pl. vi. fig. 1. The cut shows some small pediculated polypi of the cervix uteri. Here, as often happens, there was co-existent disease in the body and fundus of the uterus.

Fig. 34. Taken from a plate appended to a paper by Dr. Lee in the nineteenth volume of the *London Medico-Chirurgical Transactions.*

drawing of them, copied in Fig. 35. Indeed it is, I believe, the rule rather than the exception to it, that when we find one perhaps protruding at the os uteri, as in Fig. 36, we shall find, on further search, that there are others, sometimes to the number of four, five, or six, springing from other points of the interior of the cervix, and not discoverable till the cavity of the cervix is dilated by a sponge-

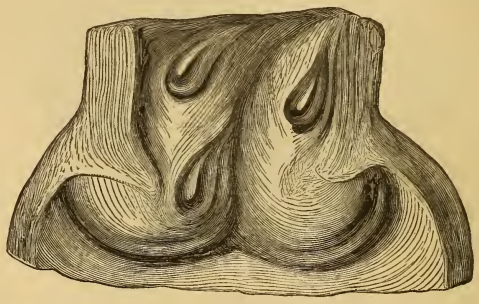

Fig. 35.

tent. When hanging from the os uteri, their stalk is sometimes so loose and long, and the small depending polypus is itself so small and soft, that it moves away before the finger in making a tactile

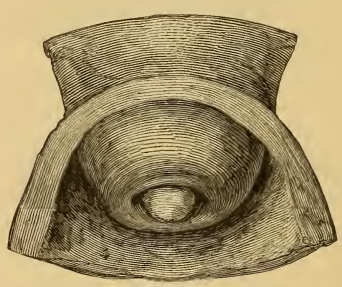

Fig. 36.

examination, and one unaccustomed to this peculiarity will not feel perfectly sure of the presence of such a polypus till the speculum is used, when the polypous body will be easily seen, generally of a cherry-red or purplish colour. Such polypi, though small, are often apparently the source of much menorrhagia and leucorrhœa, for they

Figs. 35 and 36 are representations of a single uterus. In the latter a pisiform cystic polypus is shown projecting from the os, in the former the cervix is opened up, and three small cystic polypi seen on its walls. They are from Madame Boivin's work on *Diseases of the Uterus*, plate xviii. figs. 1 and 2.

almost always co-exist with, and probably produce, some degree of ulcerative inflammation of the contiguous surface of the cervix.[1]

In trying to remove these small vesicular polypi of the cervix, it is, therefore, to be held in recollection, that there are generally more than one present, and that, to ascertain this point with any precision, it is necessary to dilate and expand the cavity of the cervix with a sponge-tent.

In more than one instance I have found these polypi, when their pedicles were perhaps long and easily broken, come away, imbedded in the surface and foramina of the sponge, which had torn them off during its expansion. But in twenty-nine out of thirty cases, more methodic measures are required for their removal—as scratching them off with the sharp finger-nail, seizing and tearing them off with polypus forceps, or dividing their stalks with a pair of scissors. If we can use the speculum, these modes of removal are greatly facilitated by the sense of sight. Indeed, if we require to use the polypus forceps or scissors, for the removal of these small polypi, and are guided by touch alone, we shall generally find the operation, though apparently simple in principle, one which is tedious and difficult to perform in practice.

In a considerable number of instances of obstinate slight menorrhagia and leucorrhœa, I have been enabled to detect the presence of vesicular polypi attached to the interior of the walls of the cervix uteri, by opening up the cavity of the os and cervix with sponge-tents, and have afterwards removed them by the methods alluded to. The following was one of the first instances in which I pursued this practice:—

Case XI.—A lady was confined of a premature child in early married life, and afterwards her health remained broken and wretched. She did not again conceive; and was unable to take walking exercise. There was a constant feeling of dragging and pressure about the pelvis. Betimes menorrhagia, and some degree of leucorrhœa, supervened. She was seen by many medical men in different parts of Europe. It was generally considered that there was a tumour on the back wall of

[1] A small cervical polypus may even produce death by the extent of hemorrhage to which it gives rise. In an excellent practical paper on polypi, published by Dr. Locock, in the London *Medico-Chirurgical Transactions* for 1848, he states (p. 171), "Upwards of twenty years ago, the late Dr. Robert Hooper showed me a preparation of a uterus laid open, having a polypus not larger than a pea, with a short and narrow peduncle attached within the cervix, high up, considerably within the os uteri, and not perceptible till the cervix was slit open. All the history which he could give me was, that the uterus was removed from the body of a young woman, who had died in the Marylebone Infirmary from long-continued uterine hemorrhage."

the uterus ; and for some years previous to my first seeing her, in 1842, she had been undergoing a course of local leeching, and other treatment, under the idea that the enlargement of the uterus was hypertrophic, and that her irregular menstruation was the result of congestion. I found the apparent tumour or hypertrophy of the uterus was formed by a complete retroversion of the organ. The cervix uteri was ulcerated, and I thought I could touch a small vesicular polypus, on pressing my finger against the os. I distended the cervical cavity with a sponge-tent ; and, on removing it next day, I was easily able to trace three or four small cystic polypi attached to the interior of the cervix. I removed them, by picking each individual polypus carefully off with small forceps. An amelioration in the irregular menstruation immediately followed ; and other means were subsequently adopted for the treatment of the other complications.

The small vesicular polypi of the cervix have sometimes, as we have already seen, long pedicles. Occasionally, however, we find, co-existing with these pediculated polypi, others that are non-pediculated or sessile ; and occasionally, after the cervix is dilated, we find others not raised yet above the level of the general surface of the mucous membrane of the part, but feeling imbedded like shot or peas in or beneath that membrane. In other words, we find, in some cases, these vesicular polypi in all their stages of formation, from small shut cysts up to pediculated vesicular tumours. When such is the state of matters, we can only remove those that are more fully formed, by the nails, scissors, or forceps. To effect a complete cure, we require other means ; and for this purpose the application of caustics to the mucous membrane of the cervix answers every indication. Nitrate of silver generally proves too weak for this purpose, unless repeated very often, and combined with scarification of the mucous surface. We possess a far more potent and certain caustic for the purpose, and one that is perfectly manageable, in potassa fusa. The surface of the os and cervix, when small vesicular polypi exist, are often found to be the seat of chronic inflammatory ulceration ; and sometimes the submucous tissue, and the structure of the cervix, is also the seat of chronic inflammatory hypertrophy and induration. When such a combination exists, the potassa fusa is doubly useful, as its application at once destroys the polypi, and sets up a new and healthy action in the affected and morbid tissues of the cervix. I have described elsewhere its great value and mode of application in inflammatory induration of the cervix,[1] and the power we have of immediately arresting and limiting its action by the neutralising effects of acetic acid. I need only add here, that I have now repeatedly found this caustic of the greatest possible use in obstinate and complicated cases of vesicular polypi of

[1] See page 712 of this volume.

the cervix, such as I have above alluded to. In illustration of its effects, I shall cite only one instance, and that because it was a case which was peculiar in several respects.

Case XII.—On the 1st October last I was called into Roxburghshire by Dr. Anderson of Jedburgh, to see a lady who had been losing large quantities of blood for three weeks previously, and in whom the hemorrhage had continued to go on profusely, day after day, in despite of all the means which he had tried for its suppression. The patient's strength had, in consequence, become greatly exhausted. She was between forty and fifty years of age, was the mother of a family, and for some years past had suffered under occasional menorrhagia. Three years ago a uterine polypus had been detected at Brussels, and afterwards removed in London, apparently with some difficulty, as the first physician who attempted it failed. Her present attack of hemorrhage was much more long-continued and severe than those that had occurred previously. Before being able to make a tactile examination of the uterus, I had to remove several large clots of blood lying in the vagina. I found the anterior lip of the os uteri very much enlarged, indurated, and roughened on the surface. By the speculum we saw this lip greatly enlarged and dotted over with small pediculated red-coloured polypi, like red currants; and the use of the mop showed them to be the source of the flooding. About a dozen of these small red polypi were within the field of the speculum, but others could be felt on the internal aspect of the enlarged lip. As it seemed hopeless to attempt to detach them all one after another by the forceps, and as doing so would not remove the suspiciously indurated and enlarged anterior lip of the cervix, I at once had recourse to the application of potassa fusa to the diseased lip itself, and melted it down, with the polypi attached, by decomposing upon it a couple of sticks of potassa, of above an inch in length each, and followed this immediately by the free and abundant injection of vinegar to neutralise the alkali. Subsequently, under the use of astringent injections and medicated pessaries, the surface took on a healthy cicatrisation, and her health greatly improved under Dr. Anderson's kind and able care. I saw the patient in Edinburgh two months afterwards, on her way home to London. There were no remains of the induration or polypi. The uterus felt natural in size, and the surface of the cervix was entirely cicatrised. There has been no recurrence of the menorrhagia. The menses have been present once, but not in unnatural quantity.

CASES OF REMOVAL OF INTRA-UTERINE POLYPI.[1]

Sir James Simpson showed the Society four intra-uterine fibroid polypi, which he had removed from three different patients within the last eight or nine days.

The first of these cases was an unmarried lady from England, who had suffered from hemorrhage for twelve years, and sometimes had been so greatly reduced by the discharge as to be invalided and bedridden for weeks. She was very white and blanched. The os

[1] See Proceedings of Edinburgh Obstetrical Society, February 13, 1867, in *Edinburgh Medical Journal*, June 1867, p. 1134.

uteri was opened up with sponge-tents, a polypus found in the uterine cavity, and its neck divided without difficulty with a small polyptome. The removal of the polypus from the uterine cavity after its detachment was by no means easy, as it escaped readily from the vulsellæ and polypus forceps that were used to catch and extract it.

In the second case, an unmarried lady from Glasgow, the hemorrhage had only lasted fourteen months, but had been sometimes very excessive. The same means of diagnosis and treatment were used, and the same difficulty met with in attempting to remove the free polypus, which was of the size of a large filbert, through the small os. Ultimately the os was divided to allow of the possibility of extraction.

The third case occurred in a married patient in Inverness-shire, who had had great intercurrent menorrhagia for nearly eighteen months. Sir J. Y. Simpson visited her at her own home in Inverness-shire, and thought he detected the presence of polypi with the uterine sound; but as a long diagnosis with dilatation was required, she was removed to Edinburgh when her strength was sufficiently recovered. In this instance, after the os uteri was opened, first one semi-pediculated polypus was felt and removed, and then the presence of a second similar one was discovered high up in the uterine cavity, and detached by partially cutting through its pedicle, and then dragging it down with vulsellæ. In regard to these cases of intra-uterine polypi, Sir J. Y. S. added the following inferences:—

1*st*, In such cases of intra-uterine polypi, the presence of the disease may be guessed by the increased size of the uterus, and particularly its cervix, which sometimes expands above as it does in a threatened abortion, and by a persistent and sometimes a great menorrhagia. Occasionally it can be felt by the uterine sound, used like a metallic finger, but usually not with any great certainty. The only certain mode of diagnosis consists in dilating the cervix uteri so as to feel the interior of the uterine cavity with the finger, and touch the polypoid body. He adverted to a case which he saw with Dr. Wood, many years ago, of a patient who died of hemorrhage from intra-uterine polypi. The autopsy in this case first suggested the idea of reaching and diagnosing the intra-uterine tumour by opening the cervix with some dilating body.

2*d*, For this purpose, sponge-tents were suggested and used by him; and more lately Dr. Sloan proposed tangle-tents. He believes

that tangle-tents are to be preferred when a slight dilatation, as for dysmenorrhœa, was required; but for a greater degree of dilatation, when we require to introduce the finger and remove a polypus, sponge-tents are preferable.

3*d*, In making the diagnosis, it is usually necessary to push down the fundus uteri with one hand pressed against the abdominal parietes, and by the forefinger of the other hand search the interior of the uterus.

4*th*, In removing intra-uterine polypi, he had sometimes found torsion an easy plan, but the forceps must be strong in blade and joint to give the necessary power. Torsion succeeded best when the pedicle was small. When the pedicle was large and thicker, and when the tumour was only of a polypoid character, division, with the tenotomy knife, of the tissue-covering of the thick neck, or even of the body of the polypus, greatly facilitated its extraction. A small polyptome, as in two of these cases, was sometimes the simplest method of dividing the pedicle; and perhaps a loop of a wire écraseur might be passed over it to separate it, but usually not without much difficulty.

5*th*, But our armamentarium was chiefly deficient at the present time in proper means to seize and extract the polypus after it was separated. Fibroid polypi are elastic, and readily jump out of the catch of any form of polypus forceps. Sir J. Y. Simpson had tried an improved form of lithotrite to lay hold of them, but it had also failed. Vulsellæ with very long teeth were difficult to open in the narrow uterine cavity, and the teeth were apt to catch hold of the uterine walls. The best instrument which he had yet found was a vulsella provided in each blade with three small and short teeth; but he suggested to the society whether some of the members could not invent a more fit and useful instrument for the purpose.

SULPHATE OF ZINC AS A CAUSTIC IN UTERINE CANCER, ETC.[1]

Sulphate of zinc is a drug extensively and daily employed by medical men in solution, in the form of collyria, of lotions, of injections, etc. No writer, however, has, as far as I am aware, hitherto pointed out that when applied as a fine *powder* to an open and diseased surface, sulphate of zinc acts as one of our most powerful

[1] See *Medical Times and Gazette*, January 17, 1857, pp. 56 and 78.

and manageable caustics. In using it for this purpose I have always employed it dried or anhydrous, and finely levigated. Sometimes I have applied it in the form of a simple powder, sometimes in the form of a paste made with glycerine, and sometimes as a strong ointment. To work it into a paste, about one drachm of glycerine to an ounce of the dried powder is required; and in this form it keeps for any length of time ready for use. A caustic ointment may be formed by pounding together two drachms of axunge with an ounce of the dried sulphate of zinc.

When used in the form of a powder, paste, or ointment, to an open or ulcerated surface, the part to which it is applied is rapidly destroyed to a depth corresponding to the thickness of the superimposed layer. The slough, eschar, or devitalised part, is of a white colour, and usually separates on the fifth or sixth day, leaving behind it (if the whole morbid tissue is removed) a red, granulating, healthy, and rapidly cicatrising wound. I have sometimes seen the edges of the wound already more or less puckered and contracted at the time of the separation of the eschar. The white slough or eschar itself shows no tendency to chemical or putrefactive decomposition, but is firm in texture and free from taint or odour. If we apply the sulphate of zinc in any case of malignant or semi-malignant ulcer or deposit, it will require to be repeated immediately after the first or preceding eschar separates, provided any yellow or unhealthy tissue remain at the bottom or in the sides of the wound, or if the surrounding hardness is not yet quite dispelled. After the last eschar is removed the remaining wound or sore will rapidly heal up under any common applications, as black wash, astringent lotions, water-dressing, etc.

Sulphate of zinc, like chloride of zinc, will not act as a caustic where the epithelium is entire, or unless it be applied to a broken or open surface. This is at once an advantage and a disadvantage; an advantage in so far that it prevents all fear of the caustic ever unnecessarily affecting any of the healthy contiguous surfaces and parts, and renders its application and use far more simple and certain; and a disadvantage, because when we wish to apply it to a non-ulcerated structure, we must first remove the intervening epithelium by a small blister, or more effectually by the application of an alkaline or acid caustic. A paste made with sulphuric acid and powder of sulphate of zinc will both, perhaps, at once remove the epidermis, and give at the same time the action of the mineral caustic. If too liquid it may be prevented from spreading beyond

the desired spot by enclosing that spot within a circle of oxide of zinc powder, or within a ring made with an oxide of zinc paste.

The local inflammatory reaction around a sulphate of zinc eschar is generally slight and transient. I have never witnessed any very marked effusion or swelling in the surrounding parts, except where the caustic was used in the neighbourhood of parts containing a large quantity of loose cellular tissue. Nor have I ever seen the general system affected by any absorption of it, or any special constitutional symptoms or disorder follow the topical application of sulphate of zinc, however freely and lavishly used. Like other strong caustics, its action is usually, but not always, attended for a few hours with considerable local pain and burning. This local suffering, however, generally disappears more rapidly with sulphate of zinc than with arsenic or chloride of zinc, and may always be relieved when necessary by the temporary use of anæsthetics or opiates, or by applying locally along with it, or before it, a very small quantity of sulphate of morphia. The devitalised part or eschar also produced by sulphate of zinc separates sooner than after most other caustics. The eschar made by arsenious acid seldom separates before the sixteenth or eighteenth day; that made by the chloride of zinc usually separates from the tenth to the twelfth day. I have generally found the eschar made by sulphate of zinc to separate as early as the fifth or sixth day.

The advantages of the sulphate of zinc, as compared with other caustics, are, therefore, in general terms:—1. Its powerful escharotic action; 2. The rapidity of its action; 3. Its great simplicity and manageableness; 4. Its facility of application; 5. Its non-tendency to deliquesce or spread; 6. Its perfect safety; and 7, I believe I may add, its efficacy.

On this last point, however, more experience will require to be accumulated than I can yet offer. But I have seen not only the surface of cancroid or cancerous ulcers speedily and perfectly excavated by its application, but the surrounding characteristic induration become at the same time rapidly absorbed, and the remaining wound very speedily cicatrise. I have seen, more than once, ulcers with irregular everted edges, dirty cavities, and indurated bases and sides, and which had been open for years, become quite softened, closed, and healed over, within five or six weeks after the first application of the caustic. In spreading epithelial or cancroid ulcer of the cervix uteri, I have found in as brief time, under the free local application of powdered sulphate of zinc, the ulcerated

surface exfoliated, the sanguineous and sero-purulent discharges arrested, the parts temporarily, at least, if not permanently, cicatrised, and healed, and the patient's health, strength, and spirits restored, though, when first inserting the caustic, I believed the disease to be altogether beyond the reach of any remedial measures.

Let me add here, that I have tried as caustics other metallic sulphates besides the sulphate of zinc. The sulphates of iron, nickel, etc., have a similar escharotic action, without presenting, as far as I know, any special claims or advantages.

In a preceding paragraph it has already been remarked that many of the most famed secret pastes and applications that have at different times and in different countries been in fashion for the cure of cancer, contain arsenical preparations as their essential and efficient base. Perhaps it may be found that sulphate of zinc is the principal ingredient in other secret caustic remedies. A few days ago, after showing some examples of the caustic properties of sulphate of zinc to Dr. Johnston of Worcester, Massachusetts, during a brief visit which he paid to Edinburgh, that gentleman stated to me, that from accidental information which he had obtained from a druggist, he believed sulphate of zinc to form the basis of one, if not more, celebrated secret American applications for the cure of cancerous disease.

Caustics are often used in practice for other purposes than the extirpation of cancerous and cancroid malignant and semi-malignant ulcerations and deposits; and I have successfully employed sulphate of zinc in fulfilling most of the indications for which escharotics are resorted to, as for example—

1. In the treatment of indurated inflammatory ulcers of the cervix uteri. To this part it can be readily applied, either through a speculum, or still more easily by means of a small ivory or wooden cylinder and piston, like the common leeching tube, or like Dr. Locock's glass tube for carrying silver solution; or in the form of a medicated pessary, made up with a small quantity of axunge or glycerine.

2. In cases of lupus and rodent non-malignant ulcers of the nose and face, and other integumental parts. Here we must not forget Rayer's rule, that not one, but a succession of applications of any caustic, is generally necessary for ultimate success.

3. In the annoying and intractable ulcerous forms sometimes assumed by certain cutaneous affections. Thus, I have seen it arrest a case of *Impetigo Rodens*, which, in despite of various applications, had gone on progressing for two years.

4. In eating down the small red sensitive tumours so common at the orifice of the female urethra, and in the neighbouring vulvar mucous surfaces.

5. In destroying ulcerated condylomata and warty excrescences.

6. In several cases I have easily introduced the sulphate of zinc and glycerine paste, by means of a small catheter-like tube and piston, into the proper cavity of the uterus, to cauterise the open surfaces and diseased structures leading to obstinate menorrhagia; and which deep points it is, I believe, sometimes difficult, or indeed impossible, to reach with any other efficient caustic. In the uterine cavity, as elsewhere, sulphate of zinc acts only upon any abraded and diseased surfaces that exist, and not to any extent upon the parts covered with healthy mucous membrane.

7. I have tried to take advantage of the highly contracting power of the cicatrices left by sulphate of zinc in the replacement and sustentation of chronic prolapsus of the uterus and bladder.

It will, perhaps, be found also adapted to the treatment of some obstinate ulcers of the limbs, and to the early cauterisation and destruction of syphilitic chancres and pustule maligne.

Other practical applications of sulphate of zinc as a caustic will, no doubt, betimes suggest themselves to the minds of the clinical surgeon and physician.

To obtain the fullest caustic action of the salt, the part or surface to which it is applied should be previously dried, or at least free from much moisture.

OCCASIONAL LATENCY OF THE SYMPTOMS IN ADVANCED CARCINOMA UTERI.[1]

In the earlier stages of cancer of the uterus, the disease is, as a general rule, accompanied by few, or indeed no, well-marked dynamic symptoms. Patients themselves, and sometimes also the members of the profession, seem to expect that the advent and presence of this fatal malady should be very constantly accompanied with local pain and suffering. The reverse, however, of all this seems to be the general rule. In fact, it rarely happens that a patient affected with uterine cancer applies at all for medical advice till the disease has advanced beyond the stage of deposit, and has already made more or less progress in the stage of ulceration. Even then the

[1] See *Edinburgh Monthly Journal of Medical Science*, January 1852, p. 44.

local symptoms which excite the patient's attention are usually not the expected pathognomonic pain, but occasional attacks of hemorrhage, attended with leucorrhœal discharge. Or, if the pain is present, it often as yet only amounts to a sensation of discomfort and uneasiness, and not to a feeling of actual suffering. Nay, sometimes any feeling of pain in the uterus or uterine region itself never supervenes at all, or not till the very last period of the affection. In the course of practice I have happened to see a number of cases to which this remark applies. Instances also occasionally occur where the patient suffers more or less severely from pain; but that symptom is in the form of a sympathetic or reflex pain, situated, not in the uterus, but in the limbs, loins, or some other distant part. Several years ago I had occasion to examine a case in which the cervix uteri was entirely eaten away by extensive cancerous ulceration; but without any marked local pain. The patient, however, had complained so much of pain in the mamma, that local anodyne and other applications had been applied to that part of the body. Dr. Davidson told me the particulars of a case in which the patient complained to her medical attendant of nothing during life, except a series of severe urinary symptoms, for which she had ineffectually undergone a variety of treatment. On opening her body after death the coats of the bladder were found deeply implicated in a mass of ulcerated uterine carcinoma. The following case, which I saw within the last few weeks with Dr. Cowan, in a patient who came from a distance in the country, is one of the most striking illustrations which I have met with of the occasional latency of the local symptoms of cancer of the uterus, even in a very advanced and ulcerated stage, and of the transference, as it were, of the principal suffering and symptoms to another organ:—

Case.—A lady, æt. 43, married at a very early age, and the mother of six children, had enjoyed the most robust health until twelve months ago. About that period she first observed a white discharge from the vagina, which she believed to be common leucorrhœa. There likewise occurred repeated discharges of blood, sometimes in large coagulated masses and shreds. At the same time the catamenia recurred with regularity and without pain. About three months since she first complained of such prostration as prevented her taking her usual amount of exercise; difficulty and pain also in passing water; and latterly, incontinence of urine supervened. During all this period she experienced no feeling of uneasiness referable to the uterus itself; nor was the leucorrhœa or menorrhagia of a nature or extent calculated to excite in the mind of the patient any feelings of alarm. In fact the principal, and, according to her own account, her almost sole symptoms, were the debility already mentioned, and the painful dysuria, which had, however, been relieved by alkalies.

On making a vaginal examination, I found the cervix uteri, with the upper and anterior part of the vagina, the seat of extensive carcinomatous induration and ulceration. The disease in its ulcerative process had in fact proceeded so far at one point, that it had implicated and *already perforated* the neck of the bladder—thus leading first to the dysuria, and subsequently to the incontinence of urine, of which the patient so much complained.

In a note from Dr. Cowan, dated December 20th, he states :— " At present our patient's appetite is good ; bowels regular. She sleeps well, and the general appearance is improved rather than otherwise since you saw her. All she complains of is, general debility, incontinence of urine, with a thin white non-acrid discharge, and occasionally, but not constantly, heat in the region of the uterus, unaccompanied with pain. All other symptoms of extensive uterine disease are absent."

Dr. Cowan has further stated to me, in a recent communication : ' Mrs. C. died ten months after you and I visited her together in Edinburgh. She gradually sank under the extension of the cancerous disease. Some time after you and I saw her, the symptoms were still so slight and trivial, that another medical man whom she saw declared that it was impossible she could have such a serious malady as cancer. She died in Paris, and the French physicians whom she consulted for a time doubted the correctness of your diagnosis and prognosis, her symptoms looking still so slight. But the subsequent course of the affection showed them the true cancerous nature of her disease."

ON CARCINOMATOUS DISEASE OF THE CAVITY, BODY, AND FUNDUS OF THE UTERUS, THE CERVIX BEING UNAFFECTED.[1]

Most pathologists and practitioners have laid it down that the cervix uteri is always, or almost always, the portion of the uterus that is first and principally affected in cases of cancer.

In a preceding page, we have seen Rokitansky stating that cancer of the uterus " always attacks the cervix in the first instance." [2] " Cancer of the uterus," observes Dr. Walshe,[3] " almost invariably originates in the cervix." In describing carcinoma uteri in his work on the *Diseases of Females*, Sir Charles Clarke remarks, " This disease

[1] See *Obstetric Memoirs and Contributions*, vol. i. p. 193.

[2] *Manual of Pathological Anatomy*, vol. ii. p. 300.

[3] *The Nature and Treatment of Cancer*, p. 96.

attacks only in the first instance the cervix of the uterus, and the author," he adds, "lays great stress on this observation."[1] "The cancerous action," according to Dr. Francis Ramsbotham, "first assails the tissues of the os and cervix uteri. I believe," he continues, "this is invariably the case."[2]

Such strong statements are liable to mislead the practitioner, and to cause, ever and anon, errors in diagnosis and prognosis. No doubt, the cervix of the uterus is much more frequently the seat of carcinomatous disease than the cavity of the organ, or the tissues of the body and fundus. But I have been myself deceived, and have seen others deceived, by the common belief that cancerous affections never originate in the cavity, body, or fundus of the uterus, and without the cervix being primarily or contemporaneously attacked. In the course of practice, I have seen, on the contrary, a very considerable number of instances in which carcinomatous disease, when affecting the uterus, has primarily sprung up in the cavity of the organ, or in the walls of the fundus or body, and in which the tissues of the cervix have remained sound to the last, or at most been only affected secondarily.

Carcinoma, when it attacks the cavity, body, or fundus of the uterus, may appear under different types or forms. The principal varieties of it which I have had occasion to observe in practice are the following:—

1. When carcinomatous disease attacks the cavity of the uterus, it sometimes presents the form of an irregular, flat, or roundish fungoid *excrescence*, attached by a broad basis to a greater or less extent of the interior of the organ.

Case I.—The first decided instance of this kind which I had an opportunity of seeing was in an unmarried lady, forty years of age, the sister of a distinguished English physician. For many months she had suffered under a constant and copious discharge of watery fluid from the genital canals, with occasional slight hemorrhage, and gradual emaciation; but there was no local pelvic pain or suffering. She was for some time under the care of an esteemed obstetric practitioner here—a friend of her brother's—and a great variety of applications were employed by him to arrest the profuse serous discharge. These applications had been all made to the surfaces of the vagina and cervix uteri; but without any effect on the copious morbid secretion. When I saw the patient with her physician and relative—as there was apparently no diseased state of the vaginal canal or cervix uteri, I suggested the introduction of a sponge-tent into the os uteri, with a view

[1] *Observations on the Diseases of Females*, p. 207.
[2] *London Medical Gazette* for 1835, p. 466.

of shutting up that aperture for a time, and thus ascertaining if the abundant watery secretion did not proceed from the cavity of the uterus itself. As long as the tent remained in the os uteri the discharge was arrested—a phenomenon not observed for many months before; and on withdrawing it there was a copious rush of the characteristic clear fluid. The morbid source of it was thus proved to be some point or points in the interior of the uterine cavity. On opening up the os and cavity of the cervix more fully with sponge-tents, we were able to reach the edge of a rough tuberose excrescence, attached by a broad basis to the interior of apparently a great part of the cavity of the uterus. Small granular portions of it were easily detached by the finger or nail. It seemed to all of us a sessile carcinomatous or cauliflower growth growing in the cavity of the uterus. The discharge continued and increased; and the patient ultimately sank under the usual course of cancer about eighteen months subsequently.

Case II.—A short time afterwards I was sent for to the Highlands to see, a week or two before her death, a patient who had long suffered under the same kind of profuse watery discharge; but in her the local disease was much farther advanced. The os uteri was dilated to the size of a two-shilling piece; the orifice was round, and its lips thin and healthy—exactly like the uterine orifice in the first stage of natural labour. There projected, however, through this opening, not any part of an ovum or fœtus, but a rough irregular mass, granular on its surface, and very friable and lacerable in its structure. It bled profusely when touched. On passing the finger over the edge of the dilated os, and within its interior, the fungating structure protruding from the uterine opening was found springing, as it were, from the interior of the cervix uteri all around, at a height varying from a few lines to about an inch. In the centre of the protruding excrescence there was an opening leading up, as shown by the uterine sound, into the cavity of the uterus. The uterus itself was enlarged, and could be felt midway between the pubes and umbilicus. Its whole interior seemed to be filled by an accumulation of this epithelial cancer. This patient was about 33 years of age. She had been long married without having any children.

Since the above period I have seen several cases of the same nature as the above at different stages of their progress. Occasionally, as in the last case I have described, the os uteri was so open as to allow the carcinomatous structure springing up from the interior of the cavity to be felt at once by the finger. In one or two instances, I have seen the carcinomatous fungus protruding through the os, sloughing and gangrenous from the stricture and compression of the circle of the os upon it. But in most instances the disease has been in an earlier stage; the patient complaining of watery and bloody discharge from the cavity of the uterus; and the true nature of the malady was not ascertained till the canal of the cervix was artificially dilated for the purpose of a more accurate diagnosis by the finger.

In some of these instances of carcinoma affecting the interior of the uterus, the whole bulk of the organ is little, if at all, increased beyond its natural dimensions, and the discharge is bloody rather

than serous; but towards the termination of the disease, it begins to present the odour peculiar to cancer, with shreds and fragments of the cancerous tissue passing along with it.

Case III.—In a patient, aged 50, I saw the disease of the uterus followed by cancerous disease of the mamma. A few years after the regular catamenia had ceased, this lady observed from time to time a slight bloody or sero-sanguineous discharge from the vagina. On examination, the cervix uteri felt normal and healthy, and the whole uterus was of the natural size. After suffering in this way for a couple of years, carcinomatous disease appeared in the right mamma, and she died in the course of a twelvemonth, without, however, the affected mamma ulcerating or fungating. A few weeks before her death, portions of cancerous excrescence protruded from the os uteri; but up to the last the cervix uteri remained unaffected.

2. Occasionally, cancer affects the cavity of the body and fundus of the uterus, in the form of carcinomatous *ulceration*, and without any appearance of excrescence and fungation.

I have seen this form of uterine cancer destroy life without any other complication. But more frequently, I have seen it result apparently as the effect of the long-continued irritation of a pedi-culated fibroid polypus upon the interior of the uterus.

Case IV.—In a case of long-standing menorrhagia, after dilating the uterine canals with sponge-tents, I removed, in the presence of Dr. Arneth of Vienna, a small hard intra-uterine polypus, attached by a short pedicle to the fundus uteri.[1] The menorrhagia, however, shortly afterwards returned, and the patient died with the usual symptoms of uterine cancer about eight months afterwards, the cervix remaining, however, still unaffected.

Case V.—Three years ago, I saw repeatedly, during the last twelvemonth of her life, a patient of Dr. Brotherston of Alloa, who complained of bloody and fetid discharges from the vagina, with the os and cervix uteri, however, apparently quite healthy. She was about sixty years of age, had borne a large family, and menstruation had ceased thirteen years before the morbid discharge appeared. The discharge was from the first offensive in smell, and of a greenish colour. There was a feeling of weight and uneasiness which never amounted to pain. At last, a fibroid polypus, which was in the interior of the uterus, sloughed and separated, and was removed artificially in a succession of pieces. For some time the patient's health seemed to be comparatively restored, and the discharges diminished; but again they became greater in quantity, very offensive, and occasionally mixed with blood. After one severe attack of hemorrhage ten days before death, all discharge whatever ceased, as if the canal into the cavity of the uterus had become occluded. Shortly afterwards, great collapse supervened; the ulcerated uterine walls having become lacerated or perforated by the retained and distending secretion. On dissection, the cervix of the uterus, from the os externum to the os internum, presented a perfectly healthy appearance. The body of the organ

[1] Dr. Arneth has recorded the case in his *Geburtshülfe und Gynækologie in Frankreich, Grossbritannien, und Irland.*

was distended into a large cavity, about five inches long, containing a semi-putrid fluid, and with its surface in several parts excavated by cancerous ulcerations, one of which had completely perforated or broken through the back wall of the uterus. The *os internum uteri* seemed to form a complete line of demarcation between the diseased and healthy parts. There was an abundance of pus and lymph in the peritoneal cavity.

Case VI.—Last year I showed to the Medico-Chirurgical Society[1] the drawing and preparation of a case of cancerous ulceration and perforation of the fundus uteri, where there still existed, attached by a short pedicle to the interior of the uterus, the remains of a fibroid polypus. The cervix uteri was unaffected with the cancerous disease. The patient had long suffered from menorrhagia and fetid discharges from the genital passages. But as in most other cases of carcinoma of the cavity of the uterus, she complained of little or no local pain during the course of the malady.

Let me observe in passing, that I have seen two or three well-marked instances of carcinoma of the cervix uteri follow apparently the irritation of a polypus when allowed to remain long without removal, even after the body of it had passed from the cavity of the uterus to the cavity of the vagina.

3. The soft or encephaloid variety of cancer sometimes affects the structures of the *fundus and body* of the uterus, without implicating the tissues of the cervix. In this variety of the disease the cancerous structure is seated in the walls of the fundus and body, and not in the cavity of the uterus. Sometimes the tumour reaches rapidly the size of a uterus at the fourth or fifth month of pregnancy. In this form there is not usually any menorrhagia or any peculiar discharge from the vagina. In the following instance, while the patient was under my care, hemorrhage accompanied it, but the hemorrhage was from the urinary, and not from the genital canals.

Case VII.—An unmarried lady, 40 years of age, suffered for some time from pains in the back and lower extremities, particularly after exertion. When at last an examination was instituted by her physician in Dublin in 1851, a large tumour was found in the uterine region. Early in 1854 the tumour increased much and rapidly in size, and when I saw her soon after, it already reached half-way between the pubes and umbilicus. But still there was no appearance of general cachexia observable. After a few weeks the morbid structure again suddenly assumed a rapid growth; a dark, sanious, and bloody discharge was passed from the bladder; and the patient sank exhausted in the course of a few days.

On laying open the abdominal cavity, the omentum was found adherent to a morbid mass, reaching from the pelvis to a point higher than the umbilicus. This mass or tumour was covered by large tortuous vessels; had a soft general consistence; and near the summit it was broken down and pulpy, and had evidently all but burst into the cavity of the peritoneum. The whole fundus and anterior wall of the uterus were implicated in the structure; but the cervix and tissues im-

[1] See *Edinburgh Monthly Journal of Medical Science*, March 1854, p. 285.

mediately surrounding it were free from morbid deposit, except in the form of two or three minute nodules. The bladder, however, was perforated posteriorly, and a portion of dark fungus from the uterine tumour projected into its cavity. The tumour, which was carefully examined, had all the characteristics of the Encephaloid or Hæmatoid variety of cancer. The cavity of the uterus presented no appearance of the disease, while the structure of the anterior wall and fundus of the organ was lost and merged in the encephaloid mass itself.

ON CARCINOMA OF THE BODY AND FUNDUS OF THE UTERUS.[1]

Professor Simpson said he had once or twice already called the attention of the Society to the occurrence of carcinomatous disease in the body and fundus of the uterus; and he had been induced to do so because of the allegation of Ramsbotham and others, that malignant disease of the uterus always commenced in the cervix, and only extended secondarily to the rest of the organ. He (Professor S.) had already demonstrated the fallacy of this observation, and had related the history of several cases where the disease had originated in the higher segments of the uterus; but he had thought it advisable to bring another illustrative preparation under the notice of the Society, the more especially as he was desirous of directing attention to a symptom which was very distinctly observable in the patient, at whose autopsy the preparation had been obtained, and which had been very marked in most of the cases that have come under his observation. The symptom he referred to was the daily recurrence—usually at a regular hour—of intense paroxysms of pain, beginning, perhaps, slight and intermittent, but soon reaching a high pitch of intensity, at which it continued for an hour or two, and then gradually subsided. Sudden and severe spells of pain of a shooting, lancinating, or "coruscating" character, such as were seen in cases of cancer of the mamma or other organs, and in the more ordinary forms of carcinoma uteri, were often observable also in the cases under discussion, where the disease had its seat high up in the organ; but what he wished to insist on in connection with the latter class of cases, was this, that in addition to the more indefinite and sometimes merely momentary pangs, the patient at some period or other of her history was also subject to the daily recurrence of the intermittent paroxysms of pain, which

[1] See Proceedings of Edinburgh Obstetrical Society, November 25, 1863, in *Edinburgh Medical Journal*, April 1864, p. 945.

sometimes lasted for hours, and might be so intense as to cause the patient to groan continuously, or scream aloud. As to the recognition of such cases, he might state that it had been doubted whether a true diagnosis could be made out during life; and a few months ago, when the two patients, whose history he was about to relate, were lying in his ward in the Royal Infirmary, and he was bringing them under the notice of a distinguished English obstetrician, who had kindly come to make the visit with him, that gentleman, after having examined the cervix uteri with his finger, and found it perfectly healthy, said, "But how do you know that there's cancerous disease inside the uterus in those women?" Well, it was commonly observed in these cases that there was—1*st*, a disagreeable watery discharge going on almost constantly, and to an unusual extent. Then, 2*dly*, there was frequent, and sometimes profuse menorrhagia, which was incapable of being arrested by any of the ordinary medicines or applications and injections into the vagina. With regard to this special symptom, he might state, that on the first occasion when he (Dr. Simpson) saw and recognised a case of the kind under consideration, this was the most prominent and distressing of the patient's symptoms. The lady was the sister of a medical man, and he (Professor S.) was called to see her in consultation with the late Dr. Thatcher, who showed the cervix through the speculum free from disease, and was inclined to think there could be no malignant formation present. A sponge-tent, however, having been introduced into the uterus, the discharge for the first time for many months had been arrested. On the withdrawal of the tent the pent-up fluid had gushed out, and the finger passed through the dilated cervix had felt the interior of the uterine cavity containing a mass of malignant tubercular granulations. In another patient whom he (Professor S.) had seen in the hospital that day, the bleeding had been going on almost daily for twelve months. Then, 3*dly*, by means of the sound we could feel the foreign body in the interior of the uterus; and by dilating the cervix with sponge-tents, we could introduce the finger and feel the diseased portion, hard, rough, and irregular, or more soft, fungoid, and friable. 4*thly*, Pieces of the morbid texture sometimes passed off and could be scraped off for microscopical examination. And, *lastly*, there was often, but by no means in every case, the periodic recurrence of the characteristic pains to which he had been calling their attention. The cases whose histories he (Professor S.) wished to relate, had been entered in the Infirmary Journal as follows:—

Case I.—E. W., aged 29, from Whitekirk, Haddington, admitted to the hospital 20th December 1862.

Patient states that, in September 1862, she found her menses increase greatly in quantity, and continue from one period to another,—the discharge being sometimes greater, at other times less, according as she employed means to check it or not. To check the flow, she used cloths dipped in vinegar; but, finding it continue, she was obliged to give up her situation. She was sent to the ward from the Servants' Home as a case of menorrhagia.

On admission, patient complained of a fixed pain in the left side of the belly, as well as of the discharge already mentioned. The sound, when passed into the uterus, entered the full distance, no more. Ordered of tr. cannabis Indicæ, 10 drops in water, twice daily.

23*d December.*—Pain and discharge much increased. Dose of the medicine as above, doubled; and to be repeated thrice daily, which checked the flow.

5*th January.*—Sore throat, which was treated with infusion of hæmatoxylon as a gargle.

8*th.*—Throat better; gargle discontinued.

12*th.*—Abdominal pain severe as ever, but discharge ceased. Patient is taking no medicine.

19*th.*—Patient states that pain comes on periodically at 9 A.M., continues more or less severe through the day, and disappears at night.

22*d.*—It was supposed some irritating cause was within the uterus; so two sponge-tents were introduced, to dilate the os. When they were both withdrawn, there was separated by means of the finger a small irregular mass of fatty-like matter, some parts of which were tough, and other parts soft, having in it a patch of soft, cheese-like matter. This was pronounced by Professor Simpson to be carcinomatous. Under the microscope, it presented compound granular corpuscles, and others filled with fat.

28*th.*—Since the last date (22d), patient has felt the sharp stinging pain in the left side of the abdomen and left iliac region much increased. It has been treated by painting with iodine, by liniments of belladonna and glycerine, and by opiates given both by the mouth and rectum.

30*th.*—Ordered of the following:—℞ Ext. cannabis Indicæ, gr.i.; Quinæ sulph., gr.iij., ft. pil.,—one pill, twice daily.

1*st February.*—Began using belladonna pessaries containing a few drops of chloroform.

2*d.*—Complained of disordered digestion and vomiting, and was ordered the following:—℞ Bismuth. albi, gr.iv.; Pulv. ipecac., gr.ss. M.—Ft. pulv. *Sig.* One, twice daily.

11*th.*—The uterus having been again dilated by sponge-tents, Professor Simpson scraped away some portion of the growth.

16*th.*—Patient has been relieved of the severe cutting pain ever since the operation. She experiences now only a feeling of uneasiness, and does not require opiates, pessaries, or draughts. She has been taking for the last three days the following:—℞ Quinæ sulph., gr.i.; Cerii oxalatis, gr.i.; Conf. rosæ, q. s. M.—Ft. pil. tales xii. *Sig.* One, thrice daily.

2*d March.*—Patient continued much relieved till this date, when the *cutting* pains recommenced.

5*th.*—A sponge-tent re-introduced with some difficulty, as the anterior wall of the uterus is enlarged, and the uterus itself anteverted.

13*th.*—Complains of great pain, relieved by the use of brandy.

25*th.*—The cervix having been dilated by two sponge-tents, Professor Simpson removed a portion of a carcinomatous growth.

6th April.—Patient has been relieved of her severe pains by the last operation, and has only complained of uneasiness since. For the last eight days, however, she has not been able to make water without the use of the catheter. Nothing like the former growth is to be found within the os. The hard base, however, on which it was implanted seems to have developed itself into a small tumour in the anterior wall of the cervix, about the size of a small egg.

17th.—There is a flat growth, as large as the tip of the finger, at the upper end of the vagina, on the left of the cervix. There are also two nodular growths on the left of the cervix, the size of small shot. The growth, when touched, gives rise to pain. She suffers great pain, which has told lately upon her strength and appetite. Ordered to use min. x. of chloroform in a bottle of soda-water. This gave relief once or twice, but soon lost its effect. Her urine not passing freely through the catheter she is obliged to use, ordered,—℞ Tr. ferri mur., ʒiss. ; Spt. ætheris nit., ʒi. M.—*Sig.* Forty drops, thrice daily.

4th May.—Patient finds that nothing relieves the paroxysms of pain so much as the injection of a teaspoonful of *undiluted* solution of the muriate of morphia into the rectum, and the internal use of brandy. The anterior wall of the uterus felt from the vagina is enlarged and tender. The os is open, and its lip has a nodulated feel on its right and posterior side.

Ward 12 was closed on the 8th of August 1863, and patient was removed in consequence to Ward 18, where she died on 20th September 1863.

Post-mortem Examination (extracted from Pathologist's Case-book).—On the 21st September 1863, E. W.'s body was examined. The lungs were emphysematous, and the left lung partially adherent. Both contained numerous cancerous nodules, the largest about the size of a bean. The membranes were fatty ; spleen natural ; liver fatty, and the kidneys natural. Intestines were not examined. The sigmoid flexure was adherent to the fundus uteri, and, in adhesion to it, a large cancerous mass. The bladder was healthy. At orifice of the urethra there was a nodule of cancerous matter. The uterus was much thickened, and its interior was ulcerated, and there was found attached to the fundus a polypus about the size of an almond. The vagina was a mass of cancerous ulcers, and there was a deep excavation in the posterior wall, which was almost perforated. The pelvic and lumbar glands were enlarged, and in them there were deposits of cancer. The mesenteric glands were free from disease.

Case II.—M. R., aged 50, admitted 29th January 1863. Patient states that she has been ailing since May 1861. For eight or nine months previous to that date she had had little menstrual discharge, till one day, after lifting a heavy weight, a bleeding came on, which was repressed by means of wet cloths in four or five days. In January 1862, the bleeding commenced again without any apparent cause. After having used a wet compress to stem the bleeding, for a fortnight, she felt pain in the hypogastric region, extending from one side of the abdomen to the other, and striking through the body to the back. This pain has continued ever since, and now begins at 12, 1, or 2 o'clock in the day, culminates between 3 and 5 o'clock, and leaves her entirely about 6 or 7 o'clock, unless a second attack is going to come on, in which case she has a remission till 10 o'clock, when the pain returns for two hours. Patient has had no bearing-down pains. The discharge, which, for a fortnight in January 1862, consisted of pure blood, is now water, with a little blood. It has no odour, and is sufficient in quantity to wet four napkins in the day. The patient is yellow in complexion, and has an anxious look. Her disease *has* been treated, but without success, by the wet compress, sponging with acids, quinine, and Donovan's solution.

On examination, the uterus was felt to be enlarged both anteriorly and posteriorly, but more especially in the latter direction. The sound passes into the uterus three inches. After dilatation by sponge-tents, a slender, long, soft polypus was felt distinctly, depending from the fundus, with another short growth, either part of itself or a distinct polypus, attached anteriorly also on the fundus. On the posterior wall, a good way up, there is a small nodule, which appeared to be about the size of a pin's head.

2*d February.*—Ordered, ℞ Ext. belladonnæ, gr.ss.; Pulv. magnesiæ, q. s. M.—Ft. pil. tales xii. *Sig.* One, twice daily.

12*th.*—The uterus was dilated by two sponge-tents, and Professor Simpson, on making an examination, was led to consider this a case of malignant disease. Ordered patient twenty-five drops, thrice daily, of liq. secal. cornuti.

5*th March.*—Two more sponge-tents have been introduced, and Professor Simpson thinks that the uterus is somewhat swollen, and ordered,—℞ Tr. cannabis Indicæ, ʒii.—*Sig.* Twenty-five drops, thrice daily. Two days after the sponge-tents were introduced, the pain began to abate, and it has been less since.

25*th.*—Two sponge-tents having been introduced, and the parts well dilated, there was felt at the fundus of the uterus a growth resembling half a marble, at the side of which there were some ragged tufts. This mass Professor Simpson scraped away.

6*th April.*—Patient has suffered a great deal of pain lately. It comes on, as before, periodically, about the middle of the day, and lasts through the afternoon, and more or less through the night also. Chloroform had been used to lull the pain for two or three days, but, as it made her sick, and interfered with her appetite, it was discontinued.

16*th.*—Ordered to use chloroform in a bottle of soda-water (min. x.) This caused some relief, but was followed by sickness.

17*th.*—*Dismissed* to-day, as her cries were injurious to the other patients, and as there was no prospect of giving her relief.

Three or four other cases of a precisely similar nature, and presenting the same train of symptoms, had come under his (Professor Simpson's) observation in private practice within the last six months, and if he had had time to look over the pages of the Infirmary Journal, he believed there would be found a record of some other cases besides those he had cited. But he thought the histories he had related brought out distinctly enough the general characters and course of the disease, and would serve to indicate the importance of the special symptom to which at the outset he had alluded. He had seen similar intermittent, periodic pains in one single case, where the patient was not affected with cancer of the interior of the uterus, and in that instance there was a hard foreign body in the cavity of the organ, resulting from the calcareous degeneration of a fibroid tumour of the submucous variety. He had also seen paroxysms of pain, approaching in character to those seen in cases of internal cancer of the uterus, in two or three instances of retention of fluid in the cavity of the uterus from occlusion of the os,—in fact, in dropsy of the organ; but, except in

those rare and isolated cases, the symptom he had tried to describe was only to be met with, so far as his observation went, in patients who were suffering from carcinoma of the body and fundus of the uterus.

ON INFLAMMATORY AND NON-INFLAMMATORY RUPTURES OF OVARIAN DROPSICAL CYSTS.[1]

The common multilocular dropsy of the ovary may terminate fatally in various ways when left altogether uninterfered with by art.

In some cases, when the tumour at last reaches those enormous dimensions which it sometimes acquires, the mere strong compression laterally, backwards, and forwards, of the diseased mass upon the various abdominal viscera, vessels, and walls, and upwards upon the diaphragm and thoracic organs, proves sufficient in itself to lead gradually on to a fatal termination, preceded by marasmus, exhaustion, dyspnœa, etc. In such instances there is a slow but increasing physical clog set to the machinery of various organs that are necessary to the continuance of life—more particularly to the processes of nutrition and assimilation; but latterly, even respiration and circulation come to be more and more interfered with; till at last the impaired and obstructed mechanism of the body is fatally arrested. Very often, however, before such a termination occurs, œdema, particularly of the lower extremities, and ascites, come to be superadded, hastening the fatal result by their presence; and almost always it is also hurried onward by the supervention, during the last stages of the disease, of a greater or less amount of irritative fever.

But patients suffering under dropsy of the ovary do not always die from the mere mechanical increase of the tumour, and its mere mechanical pressure and irritation. Much more frequently *inflammatory action* attacks the walls or dissepiments of the diseased mass during the latter stages of its growth, and expedites the progress of the malady towards a fatal termination. Occasionally the inflammatory action recurs from time to time in the same cyst or in different cysts, accompanied with fever and local pains, generally of a slight and obscure kind. Under repetitions of such attacks, the cysts rapidly increase in size, inflammatory effusions being poured

[1] See *Edinburgh Monthly Journal of Medical Science*, December 1852, p. 521.

into their cavities or deposited upon their lining membranes; and sometimes the intervening septa and walls of the tumour become diseased and broken down under them. Its external or peritoneal surface is frequently also the seat of inflammatory effusions, and of consequent local adhesions between it and the neighbouring viscera and surfaces. One or more cysts, left with purulent effusions in their cavities, or with the structure of their walls disintegrated, often enough remain as permanent sources of local and constantly recurrent inflammatory action in the tumour. Hectic fever generally comes to be set up in the system as a consequence; and under the repeated recurrence of such local and constitutional irritation, the powers of life gradually give way.

Again, occasionally, when inflammatory action, whether acute or sub-acute in its course, is present in an ovarian multilocular tumour, it proves fearfully more rapid in its course, and leads to speedy death by a different mode. For when the tumour, in one or more of its cysts, is the seat of acute inflammation, such cyst or cysts sometimes become so over-distended by inflammatory effusions, as ultimately to rupture, and allow of the escape of their contents into the peritoneum. In these cases the walls of the over-dilated cysts are occasionally rendered friable and lacerable in their structure by the inflammatory action of which they are the seat, and in consequence of this morbid softening of tissues, the rupture in question the more readily occurs. In one or two cases I have seen the walls of the inflamed and ruptured cyst present ulcerations upon its interior, the perforation of the cyst in such instances being begun by ulceration of the lining membrane and tissues of the cyst, and perfected by mechanical laceration of its exterior or peritoneal coat.

During the last two months I have met with two cases of rapid death from the rupture of inflamed multilocular tumours of the ovary, and the consequent effusion of their morbid contents into the cavity of the abdomen. The first of these cases occurred in a patient under my care in the ward set aside for female diseases in the Royal Infirmary. She had been previously under the care of Dr. Brown of Carronshore.

Case I.—Mary W.——, æt. 34, married, was admitted October 6, 1852. She had borne three children, the youngest of them now four years old. In May last she first observed a small rounded tumour in the lower part of the abdomen. The tumour was then of firm consistence, painful on pressure, and slightly movable. At the date of admission, the abdominal tumour was nearly as large as the uterus

at the full term of utero-gestation, and unequal and bosselated on its surface. It was tense and painful under pressure, and a distinct fluctuation could be traced in it. The os uteri was situated very high in the pelvis (*elevatio uteri*), and the vagina was much narrowed and stretched at its upper extremity.

During the week subsequent to her admission, the patient was merely confined to bed for the sake of rest, and placed under some simple antiphlogistic treatment. On the morning of October 13th, seven days after she entered the hospital, she was suddenly attacked with severe pain in the right hypochondriac region, preceded by a feeling as if something had burst in the abdomen. This pain increased in intensity during the forenoon, with great and general tenderness of the abdomen on pressure. In the after part of the day, nausea and vomiting supervened, and the pulse rose in frequency and sank in strength.

On the following day, at the time of visit, she expressed herself, however, much easier; the abdomen was tense, and increased in size, but scarcely now painful on pressure. The face, however, was very pinched and anxious, the surface cold, and the pulse so small that it could not be counted, and she was altogether so collapsed that there seemed little hope of her surviving the attack. That night, however, and during the subsequent day, she rallied considerably. The pulse became stronger and reduced in frequency, and she improved gradually for the next fifty or sixty hours. Five days, however, after this first rupture and attack of peritonitis another and more fatal one supervened. For, early in the morning of the 18th, when attempting to raise herself in bed, she was suddenly seized with great renewed pain in the epigastrium, followed by vomiting of greenish-coloured fluid, extreme coldness of the surface, and other symptoms of sinking and collapse. The pulse became imperceptible; and she died within twelve hours.

On a post-mortem examination, the abdomen was found to contain two or three quarts of turbid serum, while thick layers of unorganised and recently secreted coagulable lymph covered the peritoneal surface of the ovarian tumour and the more exposed parts of the abdominal viscera. At some parts, this layer of lymph was fully an inch in thickness, but quite soft and easily broken down. The left ovary was small and slightly indurated. The enormous ovarian tumour which was present, was attached to the site of the right ovary by a pedicle measuring about two fingers in breadth and thickness.

On removing the tumour out of the abdomen, a quantity of dirty, fetid, purulent fluid made its escape from an opening at the upper and back part of its right side. The aperture was of such size as to admit the forefinger. Its edges were ragged and ulcerated; and it exactly corresponded in position to the seat of pain, when the symptoms of sinking first appeared. On cutting into the cyst with which the opening communicated, it was found to contain upwards of a pint of fluid such as has been described. The wall of the cyst, for about an inch around the point of rupture, was much thinned and softened, and presented a black colour.

The remaining portion of the lining membrane of the cyst was covered with patches of recent lymph, and red spots, having the granulated appearance of the intestinal canal in acute dysentery. At the lower and anterior part of the left side of the ovarian tumour, there existed another largish cyst, presenting similar characters when cut into. Several of the smaller cysts of the tumour showed strong signs of recent acute inflammatory action; and pus oozed out in various parts when the large multilocular mass was bisected. The intervening septa were at some parts found to vary from half-an-inch to an inch in thickness, and presented on division a fibro-cystic structure. No other opening could be found in the external or peritoneal coat of the tumour, except the one already noticed.

The following analogous case of fatal inflammatory laceration of an ovarian dropsical tumour has occurred still more lately in my private practice. In this, as in the preceding instance, the tumour was unusually rapid in its general growth.

Case II.—The patient, aged 43, was married in 1836, and had been for two years a widow. She was the mother of three children. Up to the middle of last year she enjoyed uninterrupted good health. At that time she began to complain of pain in the right side; and at the commencement of the present year the presence of an abdominal swelling was detected by her medical attendants at Boulogne, where she was residing. In May last she came to Edinburgh, and a large ovarian tumour was then easily diagnosed. It continued to increase and soften with extreme rapidity; and in despite of antiphlogistic measures, iodine, etc., the abdominal swelling and distension were so very great by the first week of September, that tapping became necessary. Twelve imperial pints of a clear glairy fluid were withdrawn, but the bulk of the tumour seemed not much reduced in size by this evacuation; and it was evident that an enormous mass of cysts remained untouched, while a single and comparatively small one only had been opened. She speedily recovered from this paracentesis. By the 16th of October the re-accumulation of fluid was already so great, that tapping was again had recourse to. The fluid now evacuated was of a dark colour, and was evidently commixed with pus and inflammatory secretions from the lining membrane of the perforated cyst. During the few following weeks she complained occasionally of more or less pain and tenderness in the tumour, but was able to take some out-door exercise. On November 17th, she walked to my house, a distance of about half-a-mile, to ask if I would allow her again to begin the use of some iodine which she had formerly taken. She became sick and vomited on her return home, and subsequently complained of some abdominal pain. Next day vomiting again recurred, and the pain became far more severe and diffused over the whole abdomen. By evening the pulse was very rapid, and almost imperceptible at the wrist, the extremities cold, and the vomiting almost incessant. The symptoms of sinking increased during the night, and she died on the following day about two o'clock, retaining her consciousness to the last, and expressing herself, for some hours previously, as free from all pain.

On making a post-mortem examination, a very large multilocular tumour of the right ovary was found adhering, in different parts, to the abdominal parietes. A quantity of yellow glairy fluid, mixed with coagulable lymph, was effused into the cavity of the peritoneum. Upon the right side of the tumour, immediately below the liver, two small apertures, in two different but neighbouring cysts, were observed; and from these, fluid similar to that in the abdomen welled out upon pressure. At that part of the tumour the cysts were exceedingly numerous, and their walls, at various points, so transparent and attenuated, that under slight pressure they burst, and had their contents evacuated.

Most of the larger cysts in the tumour, and several of the smaller, showed signs of high preceding inflammatory action in their parietes. Many of them contained pus in their cavities, and their injected lining membrane was coated freely, in various parts, with particles and layers of yellowish coagulable lymph. There were perforations in the walls of most of the larger cysts, allowing of free communication between their cavities and the cysts adjoining them.

In few or none of our accounts of the pathology of ovarian

tumours, are those morbid appearances described which are produced by inflammation in ovarian multilocular cysts. But when the lining membrane of a compound ovarian cyst is the seat of inflammatory action, it generally presents, as in the preceding instances, morbid appearances similar to those that we see upon inflamed normal serous surfaces, such as the pleura and pericardium. When the effusion from the inflamed membrane is limited to serum merely, this alone is scarcely traceable; because it becomes at once commixed with, and lost among, the normal serous or gelatinous contents of the cyst. But pus is very often a result of inflammation of an ovarian cyst, more particularly if the inflammation has been subacute rather than acute in its type. The purulent matter is usually not seen on tapping or dissection, till the very lowest part of the cyst is emptied, for it is generally observed to have gravitated downwards to the more dependent parts of it. Flakes and masses of loose coagulable lymph are also often present in the contents of the inflamed cyst; or the lymph is attached to the lining surface of it, in the form of granulated spots, or larger patches and layers, or as an organised false membrane covering the interior of the cyst. When the coagulable lymph effused on the interior of an ovarian cyst becomes organised,[1] and the walls of the cyst *again* happen to be the seat of renewed inflammation, blood is frequently poured out to a greater or less extent into the cavity of the cyst, as in hemorrhagic pleurisy; and this termination is perhaps more frequently the result of inflammation of the ovarian cyst, than the result of inflammation of any natural serous membrane. Occasionally the organised lymph deposited by inflammation upon the interior of an ovarian cyst, becomes highly injected under sub-acute or chronic inflammation; and I have seen it give an appearance of roughness to the interior of the cyst, as if it had been lined by mucous membrane, beset with numerous elongated injected villi. In a few instances the interior of an inflamed ovarian cyst becomes ulcerated, the ulcerated spots being sometimes round, in other cases irregular. The perforation of the walls of continuous cysts seem sometimes to be the result of ulceration; but more frequently, perhaps, they are ruptures produced by mechanical or inflammatory distension. And now and again portions of the walls of a cyst, or of several cysts, are found dead and gangrenous, either as the result of destructive inflammatory action in

[1] In the Anatomical Museum of the University there are some specimens of ovarian cysts beautifully injected by Professor Goodsir, and the lymph on their interior is seen to be highly vascular.

their tissues, or from the circulation through them being mechanically arrested by the compression and obliteration of the vessels which supplied them with blood.

In both the cases which I have above described, the effusion of the contents of the lacerated ovarian cyst into the cavity of the peritoneum, was followed by rapid and fatal peritonitis. But many cases are on record, and I have myself seen several, in which the rupture of ovarian cysts into the cavity of the abdomen led to no such pathological result. And it becomes not only an interesting, but an important practical question to consider—

Under what circumstances is the rupture of an ovarian cyst followed by inflammatory action in the peritoneum? and under what circumstances does this dangerous consequence not supervene?

I believe the proper answer to this question consists in a reference to the condition and contents of the cyst at the time of its laceration. If the walls of the cyst, previous to laceration, have been the seat of inflammatory action, and its contents consist of inflammatory secretions, or perhaps of some other forms of morbid irritating matter, the escape of such morbific fluids into the cavity of the peritoneum, will be found, I imagine, to give rise invariably to inflammatory action in the peritoneum itself; and hence, to be always accompanied with danger to the life of the patient. But if, on the other hand, the cyst does not lacerate under inflammatory distension, but has either given way in consequence merely of the gradual thinning and attenuation of its own over-distended walls—or has ruptured under external mechanical injury, as falls, etc.—and the fluid which escapes through the laceration into the cavity of the peritoneum is of the mild unirritating character which *naturally* belongs to ovarian cysts in an uninflamed condition, then inflammation of the peritoneum has little or no tendency to supervene. The bland fluid which, under these last conditions, becomes discharged into the cavity of the peritoneum, is not a morbific irritant to that serous membrane, such as a fluid commixed with inflammatory secretions is. Nay, the lacerations of multilocular *uninflamed* ovarian cysts, instead of leading to imminent danger and probably speedy death, have frequently, though accidentally, led to the actual preservation, or at least to the prolongation, of the life of the patient. The explanation of this result perhaps merits one or two remarks.

The interior of an ovarian cyst has no power whatever of absorption; and consequently no diuretics, or deobstruents of any kind, have any therapeutic influence on the reduction of an ovarian tumour by removal of its fluid contents by the tissues of the tumour itself. But if the bland uninflamed contents of an ovarian cyst become evacuated by accidental rupture into the cavity of the peritoneum, they may be, and often are, readily absorbed from that position; the peritoneum being normally provided with abundant absorbing powers, and these powers being generally capable of being excited, when required, by the action of diuretics, etc. Consequently, when an escape of innocuous unirritating fluid takes place from the sac of an ovarian cyst into the sac of the peritoneum, it may be, and often is, rapidly absorbed and removed from the peritoneal cavity. Cases occasionally occur where nature in this way from time to time spontaneously taps, if we may so speak, an ovarian dropsy into the cavity of the peritoneum; thus ever and anon relieving the patient of the recurrent accumulations of fluid. But another and still happier result has sometimes followed the mechanical laceration of an ovarian cyst into the peritoneal cavity. In fact, in repeated instances it has been observed that in this way a cure which may be termed a permanent, though a palliative one, has taken place. For, when the laceration in the walls of the ovarian cyst has been originally large—or, though originally small, has remained *permanently* open—so as to allow of the continuous escape of the fluid secreted by the ovarian sac into the cavity of the peritoneum itself, the peritoneum, under these circumstances, has sometimes acted as a permanent absorbing surface, removing constantly the fluid eliminated by the lining membrane of the ovarian cyst as a permanent secreting surface. In these fortunate, but rare cases, another result appears sometimes to follow—namely, the ovarian tumour, if it has happened to contain one large and preponderating cyst, becomes collapsed, the fluids which have originally escaped from its own cavity surrounding and compressing its walls externally; and the interior of the cyst, thus kept with its walls in apposition, at last secretes little or no fluid; and possibly perhaps its sides may ultimately adhere together in some very rare cases.

I am acquainted with the history of two cases in which the first tapping of an ovarian dropsy has never been followed by any re-accumulation, the operation in both having now been performed several years ago. And I believe that the secret of this very unusual termination in the two cases in question, is ascribable to the

circumstance, that the perforation formed in the walls of the ovarian cyst by the trocar has remained permanently open like a fistula, allowing of the continuous drain of the ovarian fluid into the cavity of the peritoneum.

Perhaps art will yet be able to imitate both successfully and with certainty, in an appropriate set of ovarian cases, this fortunate accidental termination.

Occasionally, after a patient has been often submitted to the operation of paracentesis, an accidental rupture of the ovarian cyst has produced a comparatively permanent cure, as in the following instance :—

Case III.—A patient, now aged 56, the mother of five children, and naturally of a very robust and strong constitution, had up to the end of last year been tapped for ovarian dropsy 44 times by myself and others. Latterly, the paracentesis was required every few weeks, and an enormous amount of fluid was always evacuated. I have repeatedly seen above four gallons of fluid drawn off at a single tapping. Last winter this patient slipped in walking upon a frozen path, and so violently struck the abdomen and ovarian tumour against the ground in her fall as to rupture the cyst. Since that time, however, no new tapping has been required. The abdominal swelling, though still large, is considerably less than it was at the time of the fall, and does not increase in size. For a time the fluid of the cyst evidently escaped freely into the cavity of the peritoneum, and was as regularly absorbed from it. Latterly there has been apparently much less, or, indeed, no perceptible amount of fluid in the cavity of the peritoneum. For several months the patient's skin was in an almost constant state of diaphoresis —a result which to her appeared the more strange, as for years previously she had never been able to excite any perceptible degree of perspiration. This tendency to spontaneous diaphoresis has latterly decreased. The urinary secretion was often previously affected, and greatly diminished as the ovarian tumour enlarged. Since the fall and rupture of the cyst, the kidneys have continued to act very freely and uninterruptedly, the urine secreted being now always clear and limpid.

In the course of the preceding remarks, I have referred to the rupture of ovarian cysts into the cavity of the peritoneum only; but they rupture occasionally also into the intestinal, genital, or urinary canals, or upon the external surface of the abdomen. When ovarian cysts rupture, not into the peritoneum, but into these mucous canals, or on the external cutaneous surface, it is a matter of little moment, in relation to the life and safety of the mother, whether the cysts, before bursting, have been inflamed or not inflamed, and whether their contents be of an acrid and irritating, or of a bland and unirritating character; for there is no danger to the mother from the mere nature of the contents of the cysts when these contents have once escaped into a free mucous canal, or upon the free cutaneous surface of the body. And whatever may be the character

of the escaped or escaping fluid, we may equally hope for a temporary or more permanent amelioration of the disease. If the opening is slight and valvular, the fluid accumulating in the cyst may only escape intermittingly or imperfectly; if the opening is larger and more permanent, the contents of the cyst are sometimes kept constantly draining off from the morbid cavity of the ovarian tumour; and this cavity has in consequence, in some cases, diminished and collapsed to a degree amounting to a kind of perfect cure.

I have seen two or three instances in which ovarian cysts have ruptured externally, or into the adjoining mucous canals. The case which I have had an opportunity of watching the longest is the following:—

Case IV.—This patient felt a movable tumour in the abdomen, of the size of the fist, about the age of sixteen or seventeen. I first saw her about eight years afterwards, when the abdomen was greatly distended by a dropsical ovary, larger than the uterus at the full period of pregnancy. She was complaining greatly of the symptoms of over-distension. I removed the fluid by tapping in 1840. Fifteen months afterwards the same operation was repeated, in consequence of the re-accumulation of the fluid. But no paracentesis has been required since that time; and at the present date, November 1852, she enjoys good health. A few months after the second tapping, the patient had a tedious attack of typhus fever, accompanied and followed by peritoneal inflammation. She was confined for many long weeks to bed. Some time after her recovery, and when the tumour was again increased to a great size, there suddenly supervened, one night on going to bed, much soreness in the tumour; and this was followed ere morning by an abundant and large escape of thickish clouded fluid from the genital canals. The tumour subsided much in size under this discharge, which only, however, lasted for a few days. Again, after this discharge ceased, the tumour increased to an exceeding size; and, on the patient one day twisting herself round on the sofa, she felt, as she herself described it, "something tear" in the right side. In the course of that day a clear limpid fluid again began to pour profusely from the vagina, and the tumour immediately softened and decreased in size. This discharge has since that time continued, and has now gone on for several years. The discharge is always greatest when the patient is lying or walking, but its total daily amount is at present not great. The ovarian tumour is, she herself believes, now much less in size than after its last rupture, though it is still larger in volume than the adult head. It moves readily under pressure. The patient's menstrual life is regular and normal in all respects; she now enjoys, as I have already stated, the most excellent health; daily performs active house duties; and has latterly become so stout as to weigh upwards of fourteen stone.

The seat of the opening between the ovarian cyst and the genital tubes in the preceding case, it is of course impossible to ascertain. But judging from the dissections which have been made in analogous cases of ovarian cysts emptying themselves by the genital canals, the seat of communication is, in all likelihood, between the ovarian cyst and the Fallopian tube. Lately, Richard has shown,

that ovarian cysts do not so unfrequently as was formerly supposed communicate with the Fallopian tube, and that the cavity of the tube in consequence often becomes distended with the fluid of the adjoining cyst. But though thus distended, the tube is not in many cases sufficiently open at its uterine extremity to allow of the escape through the uterus of the contained fluid. Several cases, however, have now been observed by Morgagni, Boivin, Robertson, and others, in which, after death, ovarian cysts have been found to have such a free communication along the canal of the Fallopian tube, and this tube again with the cavity of the uterus, that the contents of the cyst escaped freely outward along the course of the genital canals.

The desultory observations offered in the preceding remarks may, perhaps, be all briefly recapitulated in the form of the following conclusions :—

1. The cysts forming an ovarian dropsy occasionally rupture, *first*, from inflammatory effusion into and distension of their cavities; or, *secondly*, the contents of the cysts being only the common bland secretion of such cysts, and unmixed with any inflammatory matter, they may rupture from mere over-dilatation and gradual attenuation of their coats, or under sudden mechanical pressure and injury.

2. When a cyst ruptures from the effects of inflammation, or contains within it at the time of rupture inflammatory secretions and materials, the escaping fluid, if effused into the cavity of the peritoneum, is always liable to be followed by dangerous, and generally fatal, peritonitis.

3. If, however, a cyst bursts into the peritoneum under mechanical injury, or in consequence of simple laceration from over-distension of its cavity, and the fluid effused into the sac of the peritoneum is consequently not commixed with inflammatory secretion, there is little or no great tendency to peritonitis.

4. Sometimes, indeed, when a non-inflamed ovarian cyst thus ruptures into the cavity of the peritoneum, the life of the patient is preserved, or at least prolonged, by this accident.

5. When an ovarian cyst ruptures into a mucous canal, or upon the cutaneous surface, the safety or danger attendant on the laceration is not regulated by the inflamed or non-inflamed character of the effused fluid.

6. In cases in which the fluid of an ovarian cyst obtains an outlet by a mucous canal, or by the skin, a temporary or more permanent reduction of the tumour and comparative cure of it may be the consequence.

Lastly, let me add that, as in many cases and points the surgery of art is an imitation of the surgery of nature, possibly the artificial repetition and establishment of the above modes of relief, if they could be imitated safely and certainly, may yet be found capable of temporarily arresting, if not curing, ovarian dropsies in some appropriate cases ; and more particularly in instances in which the great bulk of the tumour is formed by one original large preponderating cyst, or by several cysts broken up and conjoined into one common cavity or cell.

ON THE POSITION OF THE PATIENT FOR PARACENTESIS IN OVARIAN DROPSY, AND ON THE PLACE OF PUNCTURE.[1]

When paracentesis is resorted to for the relief of ovarian dropsy, the method in which the operation is performed among us, is generally, if not invariably, the following :—The patient is seated more or less upright upon the edge of the bed, or upon a chair,—a broad bandage is placed around the lower part of the trunk, and the two ends of it, crossed behind, are each entrusted to an assistant, with the view of pulling and tightening it as an abdominal compress, in proportion as the fluid is evacuated,—and a small opening is cut in the anterior part of the bandage, as an aperture by which a trocar of sufficient size is introduced through the abdominal parietes into the ovarian cyst.

The bandage or compress encircling the trunk is generally alleged to be used with two objects—*first*, To aid by abdominal pressure in the evacuation of the ovarian fluid ; and *secondly*, To secure the patient against the chances of faintness and syncope upon the sudden withdrawal of such a large quantity of fluid from a person seated in the upright position. Different kinds of compressing bandages, as linen, flannel, caoutchouc-cloth, etc. etc., have been recommended to be employed ; and the ends of them are sometimes slit or perforated, with the view both of making the compression

[1] See *Edinburgh Monthly Journal of Medical Science*, October 1852, p. 361.

exerted by them more complete, and of allowing the bandage to be run and applied more easily and accurately in proportion as the abdomen diminishes in size, during the evacuation of the contained fluid through the trocar. I have seen the operation of paracentesis in ovarian dropsy performed often, and by many different hands; but I have rarely seen the bandage run correctly, even when in the first instance it was most carefully applied, and afterwards as carefully pulled by the two assistants in charge of the two ends of it. As the fluid is gradually evacuated, the bandage, in fact, is ever liable to lose its proper adaptation to the diminishing shape of the abdomen; or it becomes oblique in its position, and, pressing upon the canula of the trocar, threatens to displace it; or, as sometimes happens, it rolls up, and strongly compresses one circle or portion of the abdomen, leaving the other parts of the abdominal tumour comparatively uncompressed and unsupported. Besides, any one who has acted as an assistant in a case of tedious tapping knows that the mere pulling at the end of the bandage is a task sufficiently irksome and fatiguing.

Latterly, when performing the operation of tapping in ovarian dropsy, I have placed the patient in the horizontal position, and dispensed entirely with the use of the compressing bandage during the operation, with, I think, no small advantage and relief to the patient, to myself, and to my assistants. If the patient be placed in the supine position, there need be no dread of the tendency to fainting and syncope, for the prevention of which the bandage is specially recommended; and, at the same time, the contents of the dropsical cyst or cysts are, it appears to me, even more easily, and certainly more completely evacuated, than when the operation is performed with the patient placed in the upright position.

In tapping an ovarian cyst in the horizontal position, the patient requires to lie as near the front of her bed or couch as possible, with the face, of course, turned towards it, and, indeed, with the distended ovarian sac projecting, if possible, over the edge of the bed. If it is previously and accurately known that it is the right or left ovary which is affected, and that there is a prospect of the tumour being very completely evacuated of its contents by the operation, the patient should lie upon the right side if it be the right ovary, and upon the left side if it be the left ovary that is diseased. The trocar is then introduced into the distended cyst at the usual part in the abdominal parietes, and with the usual precautions. Towards the termination of the operation, the most complete evacuation of

the cyst may be secured when necessary by turning the patient somewhat upon her breast, so as to make the puncture as dependent as possible—and, when necessary, by compressing the abdominal parietes with the hands—the latter a proceeding which requires to be followed in most cases of paracentesis in the upright position. One great danger attendant upon tapping an ovarian cyst consists in the liability of air to go backwards into the emptied cavity towards the latter part of the operation, when the stream through the trocar becomes imperfect, or actually intermits, in consequence of the irregularity of the abdominal compression. I believe that this accident, and its consequences, inflammation of the walls of the cyst from decomposition of its remaining contents, will be found to be much less liable to occur when the patient is tapped in the horizontal position, and the parietes of the abdomen are allowed to compress the cyst merely by their own elasticity, and by the external pressure of the atmosphere, than when the operation is performed with the patient sitting upright, and with the compression in a special degree entrusted to the proper adaptation and action of a bandage, the mechanism of which is not easily regulated. Let me further add, that the preparations for the operation are far less formidable to the patient when the tapping is performed in the horizontal position, and without bandages; and, besides, the necessity of assistants to manage the bandage is dispensed with. The compression itself of the bandage amounts to a feeling of distress and suffering with some patients; and I have been strongly assured by those who have been tapped at different times in both ways, that the absence of the bandage, combined with the horizontal position, were great advantages to them, as far as their feelings and comfort were concerned. It is almost unnecessary to add, that the edge of the bed requires to be protected by several plies of sheeting or towels; and, if deemed necessary, a bandage may be placed round the abdomen, when the patient lies back in bed, subsequent to the operation, particularly if the abdominal parietes are greatly relaxed, and the remaining mass of ovarian tumour feels very loose and mobile in the cavity of the abdomen. Sometimes, however, I have dispensed even with this secondary bandage.

In performing paracentesis for the evacuation of an ovarian cyst, the trocar is usually introduced in one of two situations—viz. either centrally, in the course of the *linea alba;* or laterally, in the course of the *linea semilunaris.* It perhaps is of little moment which of these two places is adopted, provided only the trocar is introduced

in a situation in which the fluctuation is very distinct, and the parietes of the cyst thin and equal, and in which, therefore, the instrument easily reaches the cavity of the cyst.

In selecting the place of the puncture, it must be held in remembrance that various causes may render the introduction of the trocar at particular sites difficult and dangerous; and that the presence of one or other of these causes should induce us to select another situation. For example:—*First*, The chance of wounding the urinary bladder must be avoided. The evacuation of the organ immediately before the operation, is our best security against this. *Secondly*, The uterus is sometimes elevated and drawn upwards in front of an ovarian tumour, and has been fatally wounded by the trocar in the operation of paracentesis. This ascent and displacement of the uterus can be ascertained before the operation; and all chance of injuring it would be avoided, if, as I have already stated, a point in the cyst sufficiently fluctuating and thin in its parietes be selected as the site of the puncture. *Thirdly*, Ovarian cysts have been occasionally found so turned upon their axes, that the elongated Fallopian tube has stretched across the front of the diseased ovary, and interfered with the introduction of the trocar; and a dense fibrous state of the cyst at particular parts has led to the same mischance—the cyst thus becoming merely displaced and not perforated by the pressure of the point of the instrument. A case of obstruction to tapping from this cause is detailed by Dr. Bright in the *Guy's Hospital Reports*. The puncture, in consequence, must not be made over a point which feels unequal and condensed in its structure. *Fourthly*, In the later stages of ovarian dropsy, the tumour often so compresses the contents and parietes of the abdomen, that the circulation of the blood through the abdominal portion of the vena cava is much interfered with. I have twice, in dissections of ovarian dropsy, seen the cavity of the vena cava obstructed from this cause. In consequence, a *vicarious* venous circulation is set up in many cases through the superficial veins of the abdominal parietes; which hence become greatly enlarged. These veins are often seen of the size of goose-quills or larger, and running immediately beneath the skin. In paracentesis, the wounding of one of these large veins with the trocar must be carefully avoided. *Lastly*, The epigastric artery has been opened by the instrument in ovarian paracentesis. It is on this account that some authors have advised us to select the linea alba in preference to the linea semilunaris, as the site of puncture. Mr. South relates a case, however, in which this artery was fatally

wounded when the tapping was made in the first of these sites—the linea alba. Common care, and a little examination beforehand for the seat of a pulsating artery in the thin and distended abdominal parietes, should enable us to avoid this source of danger. And if we avoid this difficulty, and at the same time select as our proper site for the operation the part where the fluctuation is most distinct, and the parietes of the sac most thin and equable, it matters not whether that be in the course of the linea alba or of the linea semilunaris. The latter is perhaps the best, because the most dependent site, if we have our patient lying, during the operation, in the horizontal position.

It has been suggested by Callisen, Macarn, Delpech, Recamier, Arnott, and others, that dropsical ovaries should be tapped through the roof of the vagina in preference to the abdominal walls. If the so-called ovarian cyst is unilocular, its contents may certainly be evacuated by this means, as well as by tapping through the parietes of the abdomen; and I have more than once evacuated the contents of a dropsy of the Fallopian tube, by introducing the small trocar which forms the usual exploring needle in this position. In one of these cases the elongated sac formed by the distended Fallopian tube inflamed after its evacuation, and, in consequence, seemed to become entirely obliterated. The patient, a lady from New York, had previously been almost incapacitated from taking exercise, and had been in bad health for several years. Since her return home she has been pregnant, and borne a dead child. But it is excessively rare that a true ovarian dropsy, so distended as to require tapping, is unilocular. In forty-nine cases out of fifty, or perhaps in a larger proportion, the enlarged ovarian dropsy requiring the operation of paracentesis, consists of the multilocular form of degeneration of the organ; and in this compound or multilocular cystic dropsy of the ovary, paracentesis by the vagina can very seldom readily or safely evacuate the contents of the diseased mass. For, in the operation of paracentesis in the common multilocular form of ovarian dropsy, we evacuate merely the contents of the *largest* cell or cells in the mass; and we reach this largest cell or cells easily through the abdomen, but cannot usually reach them readily through the vagina. This important circumstance depends upon a simple pathological law, which has not been adverted to, as far as I know, in any of the numerous essays or observations which have been published on ovarian disease. Cystic tumours of the ovary, like other morbid tumours and collections, increase always most readily

and rapidly towards that direction in which there exists the least physical resistance to their growth; and, on the other hand, most slowly and imperfectly towards that side or sides on which they meet with most opposition to their mechanical development and increase of size. Ovarian tumours do not usually grow readily, or largely, towards their inferior or pelvic sides, because the resistance of the floor of the abdomen and pelvic parietes offers in that direction sufficient impediment to their development. But they increase and develop readily in an upward direction towards the abdomen, because in that direction they meet with comparatively little resistance or opposition to their growth. And while the cells in the pelvic portion of the remaining multilocular tumour are, as far as I have examined them in a considerable number of preparations and dissections, usually very small in size, however great in number, we have, on the contrary, in consequence of the above pathological law, the largest cyst or cysts in the mass generally, if not always, placed, first, at the upper or abdominal extremity of the tumour; and, secondly, on the anterior part of the abdominal tumour, rather than on its lateral or posterior parts—the cyst or cysts in front growing more readily, because they are less resisted in their growth by the abdominal parietes in front, than the cyst or cysts placed towards the sides or back of the tumour, inasmuch as these latter are repressed by the denser fabric of the lateral and posterior walls of the abdominal cavity of the patient. It is, I repeat, in consequence of this pathological arrangement, that, fortunately, by the operation of abdominal paracentesis, we are usually able to evacuate the largest cyst or cysts in the mass; and in consonance also with the same law, the contents of such more prominent cyst or cysts are usually far more fluid, and hence more easily capable of being evacuated through the trocar, than are the contents of the more condensed and undeveloped cysts of the tumour. In fact, the larger and more anterior cyst or cysts have often their contents sufficiently fluid for evacuation by paracentesis, at the very time that the more undeveloped and more compressed cysts still contain a thick gelatiniform matter quite incapable of being evacuated through any trocar.

It is almost unnecessary to add, that the horizontal position of the patient answers as well for paracentesis in ascites as for paracentesis in ovarian dropsy. It sometimes happens that the two are combined in a greater or less degree. A few days ago I saw, with Mr. Goodsir, a case of this combination—viz. a very large multilocular ovarian tumour floating in and surrounded by a quantity of

ascitic fluid. On placing the patient in a horizontal position, the ovarian cyst was first evacuated of its contents, which were of a very dark brown colour, and mixed with old-effused blood. After the ovarian cyst was completely emptied, a second puncture of the abdominal parietes was necessary while the patient was still lying in the horizontal position, to remove the collection of ascitic fluid.

ON THE TREATMENT OF OVARIAN DROPSY BY INJECTIONS OF IODINE INTO THE CYSTS.[1]

It has been often proposed to treat dropsy of the ovary upon the same principles as hydrocele or dropsy of the tunica vaginalis. In accordance with this view, Drs. Hamilton, Scudamore, and others, have in former times injected ovarian cysts with irritating solutions of sulphate of zinc, etc.; but the results have in general proved so unfortunate and disastrous as to prevent a repetition of the practice.

In 1832, Mr. Martin first recommended the use of tincture of iodine as the surest and safest injection for the cure of hydrocele; and this drug seems now almost universally adopted by surgeons in the obliterative treatment of this variety of local dropsy in the male subject.

Latterly, various surgeons, particularly Velpeau, Bonnet, Belluerimi, etc., have extended the practice of iodine injections to the treatment of other local dropsies and cysts; to chronic abscesses; diseases of the joints, etc. And the past experience of surgeons on the subject would certainly seem to show that while the local and direct application of iodine to morbid secreting surfaces has a great power of modifying, altering, and arresting even the secretory action of these surfaces, and often changes suppurative into adhesive inflammation, it shows at the same time wonderfully little aptitude to excite any excess of local irritation and pain. Hence naturally arose the question whether it could be safely and successfully injected into such large cysts as those of the common form of dropsical ovary.

In 1846, Dr. Alison of Indiana recorded the history of a chronic case of ovarian dropsy that had been repeatedly tapped, and which he injected at last with a solution of iodine. Severe symptoms followed, but the ultimate result seems to have been favourable.

[1] See Proceedings of Edinburgh Obstetrical Society, Session XII. 1852-3, in *Edinburgh Monthly Journal of Medical Science*, May 1854, p. 467.

In 1851, Dr. Simpson assisted Mr. Syme in injecting a cyst in the neighbourhood of the ovaries, but not a common cystiform ovary. The symptoms which ensued were those of considerable excitement; but the original cyst apparently became obliterated. Another one in its vicinity has lately shown itself in this patient.

Within the last year Dr. Simpson has, subsequently to tapping, injected into dropsical ovarian cysts the tincture of iodine in seven or eight cases. For this purpose he has employed the common tincture of iodine of the Edinburgh Pharmacopœia, undiluted. He has usually thrown into the cyst two or three ounces of the tincture. In some cases he has allowed a portion of the injected fluid to re-escape; in others has retained the whole of it in the sac of the cyst that was tapped. From these cases he drew the following conclusions:—

1. In none of the cases of ovarian dropsy treated with iodine injections after tapping has he yet seen any considerable amount of local pain follow the injection, with one exception; in most instances no pain at all is felt; and in none has constitutional irritation or fever ensued. In the one exceptional case, considerable local irritation followed; and the pulse rose to 110; but the same phenomena occurred in the same patient after previous tappings, without iodine being used.

2. While the practice seems thus so far perfectly safe in itself, it has by no means proved always as successful as in hydrocele, in preventing a re-accumulation of the dropsical fluid; for in several instances the effusion into the sac seems to have gone on as rapidly as after a simple tapping without iodine injection.

3. But, in two or three of the cases, the iodine injection appears to have quite arrested, for the time being, the progress of the disease, and to have produced obliteration of the tapped cyst, as there is no sign whatever of any re-accumulation, though several months have now elapsed since the date of the operation.

Lastly. Accumulated experience will be required to point out more precisely the special varieties of ovarian dropsy most likely to benefit from iodine injections, the proper times of operating, the quantities of the tincture to be injected, and other correlative points. Perhaps the want of success in some cases has arisen from an insufficient quantity of iodine being used, and from the whole interior of the cyst not being touched by it. The greatest advantage would of course be expected from it in the rare form of unilocular ovarian cysts. In the common compound cyst, the largest or most pre-

ponderating cyst is usually alone opened in paracentesis; and though it were obliterated, it would not necessarily prevent some of the other smaller cysts from afterwards enlarging and developing into the usual aggravated form of the disease.

RESULTS OF THE TREATMENT OF OVARIAN DROPSY BY IODINE INJECTIONS.[1]

Professor Simpson said he had now employed these injections in twenty or thirty cases, with varying results. In the first operation, the first, he supposed, in which it had been used in Great Britain, the tumour is still present, but never has again increased to any great size. Sometimes the injection in his hands had proved quite successful. Lately he saw two patients on whom he had operated three years ago. In one of these cases, a young person of twenty or twenty-two, who had been once or twice tapped before, the dropsical tumour was of very great size, and the patient's health and strength were rapidly breaking down when the iodine injection was had recourse to. There has been no return of the dropsy, and the patient is now quite well and strong. He lately saw an elderly patient, upon whom he had operated about the same time, with a similar successful, and apparently permanent result. In other cases the iodine injection had been completely or partially successful—partially in several, inasmuch as it had obliterated the largest cyst in the multilocular tumour, but had not prevented the remaining smaller cysts from growing and developing. In some, on the other hand, it had so far entirely failed, that the cyst, operated on and injected, had again refilled; but perhaps, as a general rule, not so rapidly as when no injection was used. The failures were, in special instances, perhaps traceable to the iodine being too much diluted by the fluid left in the cyst; to the quantity of iodine used being too small, or too weak; to care not being taken to bring it in contact with the whole interior of the cyst, and other possibly avoidable causes. No doubt it was a valuable means in some cases, especially where the dropsy was principally limited to one or two large cysts; and no doubt it would fail in others, especially where the tumour had several large cysts developing simultaneously. The iodine injection was seldom attended with much pain, or with any severe local or

[1] See Proceedings of Medico-Chirurgical Society of Edinburgh, December 17, 1856, in *Edinburgh Medical Journal*, February 1857, p. 754.

constitutional irritation. Out of the twenty or thirty cases in which he had injected ovarian cysts with iodine, in only one instance had death subsequently occurred, namely, in a patient to whom he was called by Dr. Monroe, of Dundee. The dropsical distension of the abdomen in this patient was, before tapping, greater, he believed, than he had ever before witnessed, and the iodine injection was used at the first tapping. Was the fatal result attributable to the tapping or the injection? He had now used the iodine injection so often, without any marked local suffering or constitutional reaction, that he was inclined to doubt if the iodine were in any degree blameable; while he had so frequently seen danger and death follow first tappings, and where nothing but tapping was used, that he believed the result was to be ascribed to the paracentesis, rather than the injection.

OVARIOTOMY;

IS IT—OR IS IT NOT—AN OPERATION JUSTIFIABLE UPON THE COMMON PRINCIPLES OF SURGERY?

ARE—OR ARE NOT—CAPITAL OPERATIONS IN SURGERY JUSTIFIABLE TO THE EXTENT GENERALLY PRACTISED?[1]

"In truth there are Brothers who will brag of the many they have dismembered; but they that truly understand Amputation and their Trade, well know how villainous a thing it is to glory in such a Work—it being more for your credit to save one Member than to cut off many."—*Richard Wiseman's 6th Chirurgical Treatise.*

"Cut off—
Unshriven, unanointed, unaneeled:—
If thou hast nature in thee, bear it not."
Complaint of the Ghost in Hamlet.

Dr. Bennett having communicated to the Medico-Chirurgical Society of Edinburgh, on the 3d of December 1845, a case in which ovariotomy had been performed, Professor Simpson stated, that he believed ovariotomy quite unjustifiable in many of the cases in which it had been had recourse to, but in a few rare instances, like that of Dr. Bennett's patient, quite as justifiable as most of the operations performed in surgery for chronic affections. And it appeared to him that two circumstances prevented ovariotomy from obtaining a fair consideration and fair trial, especially with professed

[1] See Proceedings of Medico-Chirurgical Society of Edinburgh, December 17, 1845, in *Edinburgh Monthly Journal of Medical Science*, January 1846, p. 56.

surgeons. *First*, the diagnosis and the operation were, under the existing divisions and arrangements of practice, undertaken by two different sets of practitioners—the former by the obstetric physician, and the latter by the operating surgeon. It was, perhaps, the only capital operation in which the surgeon was now required to proceed upon the diagnostic knowledge of another party; and no one was to be blamed if he felt a natural repugnance to incur so serious a responsibility on such grounds. *Secondly*, surgeons, as a class, still confessedly allowed themselves to be greatly bound and swayed by the trammels of authority, and the mere fact that some of the highest names in surgery had once declared, with or without due investigation, against ovariotomy, is with most others an ample and satisfactory reason for totally rejecting the operation. In the same way, but in an opposite direction, the leading authorities in the surgical world having agreed to consider ligature of the *arteria innominata* as a legitimate operation, it has now been repeatedly performed. But what has been the result? Why, the vessel has been tied some twelve times, according to Mr. Phillips—it might be oftener, or it might not be so often—but, at all events, *as often as* the operation had been performed, it had proved fatal; and yet, because it had been decreed proper and justifiable by authority, we find it in the very last text-books on surgery still commented on as such; whilst ovariotomy, as proving fatal in one out of every two or three cases, was loudly denounced as improper and unjustifiable. In the important department of surgery, such inconsistency would doubtlessly betimes become rectified—when, as had been long the case in medicine and midwifery, the dogmatism of mere facts and experience came to be more respected than the dogmatism of mere opinion and authority.

The diseased condition of the ovary, to which the operation of ovariotomy was particularly applicable, if applicable at all, was, in Dr. S.'s opinion, that form of ovarian dropsy which was by far the most frequent of all, and consisted in multilocular cystic degeneration of the organ—the gelatiniform or areolar cancer of some authors. All other forms of ovarian dropsy, as they were called, were rare in comparison to this; and to it all remarks, in such a discussion as this, principally or entirely applied. In most instances—in nine cases out of ten—this species of ovarian dropsy pursued, he believed, a regular progress onward, towards greater or less enlargement, insufferable distension, more or less repeated palliative tappings, frequently disintegration of the morbid structure, local irritation,

constitutional exhaustion, and death. Generally, it took a series of years to run its course, but sometimes it passed through its phases and progress more rapidly. We want a sufficient body of well-observed facts to know the average duration and simple natural history of this, as of most other diseases. Some authorities averred that the disease occasionally went on for twenty, thirty, forty, or fifty years. He doubted entirely the truth of such alleged cases, and believed that abdominal tumours, with this history, were not affections of the ovary at all, certainly not its cystic multilocular disease, but fibrous tumours of the uterus, which were often exceedingly chronic in their progress, and, as he had repeatedly seen, were very frequently mistaken for the ovarian affection under dispute. Again, it had been as strongly averred that cases of multilocular dropsy of the ovary had been absorbed and cured. He equally and entirely doubted the validity of this observation. Errors in diagnosis would, he believed, account readily for all such therapeutical incredibilities. He had seen hysterical tympanitic distension of a portion of bowel, and collections of fæces, mistaken for ovarian tumours; and these were certainly quite curable. He had, in several instances, seen also ovarian dropsy very perfectly simulated in form, figure, situation, etc., by large chronic inflammatory effusions into the cellular tissue of the pelvis and broad ligament, always commencing with and accompanied by inflammatory phenomena; and these, like similar inflammatory effusions elsewhere, were always more or less completely amenable to medical treatment. But he had no belief whatever that iodine, or mercury, or muriate of lime, or aqua potassæ, or diuretics, or deobstruents, or aught else, were capable of absorbing and removing the complicated structure and contents of a multilocular cystic tumour of the ovary. He would almost as soon believe that the head could be absorbed and removed by medicine. When the disease was accompanied with much local vascular action and congestion, the occasional loss of blood was certainly sometimes beneficial. But in the general run of cases of this malady, he had long come to the conclusion that we did all that was possible with medicine, when we kept the individual functions of the economy as near as possible to their individual standards of health. Break down the activity and vigour of the system by mercury or other debilitating medicines, and then the ovarian disease only too often progressed with double strides.

Seeing medicine was of so little direct use—what measures had surgery to propose? The cystic structure of the tumour had been

tapped and injected in imitation of the treatment of hydrocele—setons had been passed into it, and through it—incisions had been made into its walls, etc. etc.; but all such operations were now, he believed, abandoned by general consent, as useless in their effects, and far too often fatal in their practice to admit at all of repetition. In fact, two measures only were at the present day applied to the surgical treatment of the disease—namely, 1. Tapping; and, 2. Total extirpation. The first of these operations—tapping—was professedly adopted merely as a palliative measure—for the present relief of the patient—not for the cure of the disease. In a very few instances the tumour appears to become bound down by adhesions after tapping, and no re-accumulation takes place; but these cases are so very rare, that in practising the operation we scarcely even venture to reckon upon the possibility of this occurrence. In some cases where the tumour is very large, but the cells small, and containing gelatiniform matter, tapping is of no use, and cannot in any degree evacuate or diminish its contents. Fortunately for the success of this operative procedure, the anterior and superior cell or series of cells were generally large, and dilated more than the others, in consequence of least resistance being opposed to their growth and distension in this direction. And tapping, when adopted, though a palliative measure only, was by no means so free from danger as some practitioners think, and some writers would seem to allege. We had as yet no sufficient collection of data to show its actual results. But Mr. Southam had commenced the inquiry, by tabulating the results of twenty cases of the operation. Fifteen of these cases had been recorded by Drs. Bright and Barlow, without apparently any view to such an investigation, and hence afforded the more valuable and unprejudiced evidence. Four of the twenty patients, or one in five, died of the effects of the first tapping. Four patients died of inflammation within a few days after the operation; three more died in one month; fourteen in all died within nine months after the first tapping. Of the remaining six, two died in eighteen months, and four lived from periods varying from four to nine years.

Paracentesis, whilst thus merely a means of *palliation*, was still a proceeding in which no inconsiderable amount of danger appeared to be incurred. Ovariotomy, on the other hand, was an operation which, if successful, was professedly a means for the perfect and radical *cure* of the disease. But it was undoubtedly a most serious and dangerous operation; was it therefore warrantable or unwar-

rantable, when judged of by the *principles* applied by surgeons to the determination of the propriety of other capital operations in chronic diseases? Let us consider ovariotomy and the objections to it in this point of view; for by such a comparative test will the propriety or the impropriety of the operation be best ascertained and determined. The principal objections which Dr. Simpson had heard urged against ovariotomy were as follows:—

1. *It was an operation accompanied with great danger and mortality.*

All parties are ready fully to admit this point. But it is by no means a matter decisive, as some think, of the impropriety of the operation. At all events, if ovariotomy is to be condemned and suppressed on this account, several of the legitimatised capital operations in surgery must be equally, or still more strongly, condemned on exactly the same charge; for it is in reality not more fatal than many of these operations, and even not so fatal as some of them. On this subject, the mortality accompanying capital operations in general, very erroneous views seem to be entertained by many members of the profession. The statement of a few simple statistical facts will serve to prove the position assumed, and may, perhaps, surprise those who have not directed particular attention to the subject. Dr. Churchill, Mr. Phillips, Dr. Atlee, and Dr. Cormack (see his *Journal* for May last), had each calculated the mortality in ovariotomy, from the cases on record, and came to nearly the same conclusion. Dr. Simpson took Dr. Cormack's results as being those of a writer against the operation, and hence his tables could not be suspected of any unfair leaning towards ovariotomy.

Out of 89 cases in which ovariotomy had been either performed or attempted, 34 sunk, or nearly 4 in every 10 patients died.

Out of 65 cases, collected by Dr. Cormack, in which the operation had been perfected, 25 died, or between 3 and 4 out of every 10 patients were lost.

Now Malgaigne has shown, that out of 852 amputations of the extremities of all kinds, including those of the fingers and toes, which were performed in the Parisian hospitals from 1836 to 1841, 332 died, or about 4 out of every 10 proved fatal.

Among these, out of	201	amputations of	the thigh,	126 died, or	6	in every	10
,, ,,	192	,,	leg,	106 died, or	5½	,,	10
,, ,,	91	,,	arm,	41 died, or	4½	,,	10

Of the amputations of the thigh, in 46 cases the operation was performed for severe injury of the limb: of these 34 died, or more than 7 out of every 10.

When we looked to the results of amputation nearer home, the results were not much more encouraging. In the Glasgow Infirmary, from 1795 to 1840, Dr. Lawrie has shown that out of 276 amputations performed, 101 proved fatal, or nearly 4 in 10 died.

Among these, out of	128	amputations of the	thigh,	46 died, or	3½	in every	10
,,	,,	62	,,	leg, 30 died, or	5	,,	10
,,	,,	53	,,	arm, 21 died, or	4½	,,	10

In the Edinburgh Infirmary, during the four years commencing July 1839, there occurred 72 amputations of the thigh, leg, shoulder-joint, arm, and forearm. Of the 72 patients, 37 recovered and 35 died—or nearly 5 in every 10. Of these amputations, 18 were primary. Out of 4 primary amputations of the leg, one patient recovered and 3 died. Out of 4 similar amputations at the shoulder-joint, 1 recovered, and 3 died. There was one primary amputation of the arm; the patient died. There were eight primary amputations of the thigh; all the eight patients died.[1]

Mr. Phillips has collected the histories of 171 cases in which the larger arteries of the body were tied; of these 57 died, or about 3 in every 10. Dr. Inman has collected 199 cases of these operations; 66 died, or about 3⅓ in every 10. Out of 40 cases of ligature of the subclavian artery which he has tabulated, 18 proved fatal, or nearly 5 in every 10 died.

In his work on hernia Sir A. Cooper records 36 deaths among 77 operations for that disease, or nearly 5 in every 10 died. Dr. Inman has collated 545 cases of operation for hernia; 260 proved fatal, or nearly 5 in every 10 of the patients died.

In the earlier years of life, lithotomy is comparatively a safe and legitimate operation, and few die. But it is quite different when the operation is submitted to at forty years of age, and upwards. At and above this term of life, Dr. Willis has shown, from numerous statistical returns, that from 2 to 5 out of every 10 operated upon die.

Even what we deem slighter operations are sometimes attended in the absolute by no inconsiderable danger to life. Out of 95 cases of excision of the mamma, referred to in Dr. Cormack's *Journal* for February 1843, 20 died, or 2 in every 10. In how many cases

[1] See Dr. Peacock's *Official Reports*.

of the remaining 75 would the disease inevitably return, and ultimately destroy the patient?

Ovariotomy, then, is fatal in the proportion of about 35 or 40 in every 100 operated upon; but in most capital operations we have singly as high or even a higher mortality than 35 or 40 per cent. Amputation of the thigh has a higher mortality. So has amputation of the arm. So has ligature of the subclavian, for aneurism. Tying the innominata is fatal in every case. The operation for hernia has a higher mortality. Lithotomy is as fatal in most hands after the middle term of life. Even amputation of the leg below the knee is scarcely more safe, or at all events as many, or more, die after amputation of the leg, in the hospital practice of Paris and Glasgow, as die after ovariotomy.

It had been foolishly objected to the statistics of ovariotomy, that we did not know all the unsuccessful cases. Dr. S. believed that the ascertained statistics regarding it were as full and complete as the statistics regarding any other capital operation. It was too serious and too startling an operation for any cases of it to remain easily hid. On the other hand, it could be readily shown that the statistics of our major surgical operations were not always reported in the most faithful manner, and so as to give the most accurate results. Malgaigne candidly confesses as much in regard to the elaborate statistics which he has collected of various surgical operations from different hospitals.

The existing results regarding ovariotomy would, probably, be on all hands allowed to demonstrate one point, namely, that exposure of the cavity of the peritoneum was not so dangerous a proceeding as was formerly thought by pathologists. Surgeons have exposed it often in hernial operations, and even left ligatures upon its omental vessels when necessary, and not unfrequently with impunity. In 1842-43 a portion of the omentum was removed in six operations for hernia at St. George's Hospital, London. "In some of the cases, two ligatures, each embracing one-half of the omental mass, were applied; in the other cases, ligatures were applied to all the bleeding vessels." Five of the six patients recovered. One died comatose, a few hours after the operation, from disease of the brain.[1] But still, it must be confessed, extreme dread of all such abdominal surgery was, and probably is, the prevailing idea. The comparative success of the Cæsarean section in the hands of Continental accoucheurs might almost have taught us a different lesson, the peritoneal cavity

[1] Hewett in *Medico-Chirurgical Transactions*, vol. xxvii.

in that operation being of necessity freely opened up; and we may daily see the same done upon the females of some of our domestic animals, with remarkable impunity, in the coarse operation of spaying.

2. *The ultimate results of cases of Ovariotomy were alleged to be unknown and unfavourable.*

It was urged that the reports of cases had been published with too great haste, and before the final effects could be known months and years afterwards. Great weight had been attached to this argument in the question of ovariotomy. But it probably would be found to tell against other capital operations with much more truth and effect than against ovariotomy. In how few instances were the published reports of capital surgical operations carried beyond a few weeks? And what a large proportion did die within a short period after escaping from the more immediate consequences of the operation for aneurism, and stone, and cancer, and amputation—and that with very broken and imperfect health, too, during the interval. The primary history of cases of these operations was given, yet not their ultimate history. Dr. Simpson at the same time adduced various facts, to show that, as far as regarded ovariotomy, the allegation did not in reality hold good. The process of reparation after ovariotomy is, say some, too great to be accomplished with health and safety. Theory may argue so—but facts here give a direct and practical denial to theory, by demonstrating the reverse to be true. In one of the first cases operated on, Emiliani's in 1816, the patient has since become the mother of five living children—an ample proof of the completeness of the cure. Dr. Simpson read a note from Dr. Clay of Manchester, stating the present condition, on 14th December 1845, of the patients that he had operated upon two or three years back. His first patient, operated on 12th September 1842, "continues quite well, and follows her household duties with ease and comfort." A patient, subjected to ovariotomy on the 25th September 1842, "is at this time perfectly well, and capable of greater exertion than most women of her age—viz. 60." Regarding a third patient, operated upon in November 1842, Dr. Clay states, "I saw this case a few days ago on account of a polypus of the nose—in every other respect she is quite well." A patient operated upon in August 1843 "is at this time perfectly well—saw her a few days ago." Dr. Clay operated on two cases in October 1843: "the first

remains at this time quite well"—the second reports herself "in better health now than in any part of her former life." A case was operated upon in November 1843: "I have," says Dr. Clay, "seen this woman frequently of late whilst attending other branches of the family—she is quite well;"—and so on with regard to some others.

3. *It was argued that the extirpation of the affected ovary would not necessarily effect a perfect cure of the disease, or secure the patient against its return.*

This certainly holds true of the diseases for which several of the major operations in surgery were performed, but as certainly it did not hold true of multilocular dropsy of the ovary. The surgeon amputates a limb, or excises a tumour for some form of carcinomatous disease, hazarding more or less the life of his patient for the temporary removal of a diseased action which is almost perfectly certain to recur. He ties the subclavian for aneurism—but is it not a disease which is very liable to co-exist in different vessels at the same time, or to form consecutively in different parts—and if the patient escapes the great and immediate dangers of the operation, has he any surety against its re-appearance elsewhere? You amputate the thigh to get rid of a scrofulous or tubercular knee-joint. But in how many cases is local tubercular disease the mere result of a general diathesis, that ere long will betray itself in some other part or organ? Dr. Simpson thought it a point of the highest practical moment to consider that, on the contrary, the pathological nature of multilocular disease of the ovary was such that it had no tendency to recur after its complete removal. From the character of its morbid structure, and its clinical history, it was certain that it presented no liability to spring up again, like malignant or tubercular disease, in the same locality—or in distant and in different organs of the body. The other ovary might be partially affected, and if so, might require removal along with the first—a step which at the time would probably not add much to the absolute danger of the operation—seeing the abdomen was once opened. Do not surgeons operate for popliteal aneurism, when it is present in both limbs, even with the additional chances of an analogous diseased condition of the vessels existing internally? Probably it will be found that a surgeon would more rarely require to repeat ovariotomy, in consequence of the remaining ovary subsequently becoming diseased, than he now requires to repeat lithotomy, in consequence of a second or a third stone forming after a time in the bladder.

4. *Ovarian disease, it was averred, does not produce such dangerous and urgent symptoms as to demand an operation.*

Dr. Simpson said that he had already adverted sufficiently to the dangerous and ultimately fatal tendency of the common multilocular dropsy of the ovary. He had at present charge of one case, where an enormous ovarian tumour produced occasional most intense suffering, in the form of severe abdominal pains and spasms resembling the agonies of labour. In many cases where it had reached a large size, it more or less incapacitated the patient, by its simple weight and volume, from following the ordinary duties belonging to her station; and if poor, threw her upon the bounty and charity of others. In most it was, after a time, liable to be attended with local attacks of irritation and inflammation, fever, etc., or produced dyspnœa, difficult progression, etc.

He doubted if, in many cases operated upon, of aneurism or necrosis, or ulcers, etc., supposed to demand amputation, etc., the suffering or the incapacity from the duties of life were greater than in a large proportion of ovarian cases. But, argue the surgeons, *we* operate early in aneurisms, etc., because they continue to increase—the same is true of ovarian tumours; because the aneurismal swelling is, after a time, liable to affect the structure of neighbouring parts, and render late operative interference less successful—the same is true of ovarian tumours; because with the aneurismal disease the constitution will sympathise and become debilitated—the same is true of the ovarian tumour; because the aneurism may burst and endanger life—the same is true of ovarian tumours. He had, two years ago, seen one burst into the peritoneum, and prove fatal; its parietes were eroded by small internal ulcerations at several points, and at last had given way. Any argument urging haste in the one case, would, he feared, equally apply to the other. On the contrary, would proper palliative treatment applied to *local* aneurisms not stay their progress, and make them as chronic, if not more so, in their course, than multilocular tumours? Mr. Fergusson has lately stated that he has watched one case of axillary aneurism "for several years" without its increasing. And aneurisms sometimes are, at last, spontaneously cured; much oftener, he believed, than ovarian dropsies. Take another case that happened in the Hospital practice this morning. A man applied with stricture, and symptoms of stricture only. On passing a small bougie, a stone is struck in the

bladder, and the patient is forthwith advised to submit his life to all the perils and consequences of lithotomy, though he has no suffering traceable to the calculus. Would it be justifiable to advise a patient with an ovarian dropsy, giving her no trouble, to submit in the same way to ovariotomy? He most assuredly thought it would be utterly unwarrantable. And the palliative treatment for urinary deposits and calculus was, it must further be recollected, now far more advanced than the palliative treatment of ovarian dropsy. A calculus of this kind would not be likely to increase so rapidly as to destroy the patient in five or ten years. An ovarian tumour very likely would do so. And sometimes, as in this case, a urinary calculus does not really give rise to such uneasiness as to demand any very active palliative treatment. Do we not sometimes see calculi in the bladder after death, which have never given rise to any marked symptoms during life? Again, does not the operation for the obliteration of the varicose veins of a limb sometimes prove speedily fatal, and yet the disease itself is one easily palliated by rest and bandages? Besides, this recognised legitimate surgical operation for varicose enlargement was not only dangerous to life, but, he feared, useless in its effects. In most cases, at least, the disease was as bad again in a few months as it was before surgical interference was adopted. Did we not sometimes see surgeons amputate the limb, when it was merely the seat of simple and benign, but untractable ulceration? And ulceration might be a very serious inconvenience to a labouring man; but here we have a dangerous and often fatal operation performed for a disease which was not fatal nor dangerous in its own character, and that easily admitted of palliative treatment. Altogether, it appeared to him, that the question of *when* we should conscientiously deem ourselves entitled to practise ovariotomy, or any other dangerous operation, for a chronic disease, was one that had hitherto received no sufficient attention. It was a question that probably must always be decided much upon the merits of each individual case, and in regard to which different minds may come to opposite and yet conscientious conclusions. It always embraced a difficult moral and professional problem, in cases where the required operation was, as in ovariotomy, ligature of the larger vessels, amputation, lithotomy, etc., directly and immediately dangerous to the life of our patient. It resolved itself in such a case into a question of this kind:—*Am I conscientiously* ENTITLED *to inflict deliberately upon my own fellow-creature, with my own hands, the imminent and immediate chance of* DEATH, *for the proble-*

matical and prospective chance of his future improved HEALTH *and prolonged* LIFE? In calculating what *amount* of danger of present death ought to be incurred for the hazard of future good, many secondary elements necessarily entered into the problem—such as the existing chance of otherwise palliating the disease and prolonging life with certainty for months or years—the extent of attendant suffering—the probability of the affection recurring—or already existing elsewhere, etc. etc. In such a calculation, the ideal glory of a successful operative result has probably been too often allowed to dazzle the calm judgment of both the operator and his patient, and the darker but equally truthful shades of the picture have been, for the moment, so far obscured and unseen. With the patient the stern reality of danger and death too frequently vanishes, here as elsewhere, before the strong hope of life. And the surgeon, like the soldier, is, in the computation of his successes, perhaps too liable to forget the actual amount of human suffering and human fatality through which these successes are obtained.

5. *It has often been argued against ovariotomy, that the operation, when begun, could not sometimes be completed, from adhesions, etc.; or no tumour could be found.*

These circumstances were the results of imperfect diagnosis; and he adverted to the occasional difficulties connected with the discrimination of ovarian tumours, and admitted them to their full extent. He explained that he could scarcely conceive the repetition of some of these errors if due caution were adopted. If other means failed, an exploring needle would always certify the presence of a tumour, and its structure or nature; the uterine bougie would show if the tumour were situated in the uterus or ovary, etc. The chief and ruling difficulty at this moment was assuredly that of discovering the existence or not of adhesions of the tumour by false membranes, their extent, etc. If this point could by any measures be cleared up, it would remove one of the great, perhaps the greatest existing objection to ovariotomy. Nor was it totally hopeless. One of the most sure and solid advances made by modern pathology was our gradual but great improvement in the physical diagnosis of the diseased states of different organs. Probably the next marked step in this path would be the detection of some measure or measures for improving our knowledge of the physical diagnosis of diseases of the abdominal viscera. It was not more extravagant to expect

this, than thirty years ago it would have been extravagant to expect all the vast aid and certainty which we now derive from auscultation in the physical diagnosis of diseases of the chest; and he believed some important steps had been already made regarding the detection of ovarian adhesions by Dr. Frederick Bird of London and others. Dr. Bennett's contribution was, under this head, of the highest pathological and practical value. As soon as the ovarian tumour in the case described by him was exposed, it was evident to all who had taken an interest in the question, that the accompanying ascitic effusion oozed by apertures from the interior of the ovarian tumour, and was a secondary result. But if, as Dr. Bennett would, he doubted not, be able ultimately to show, it was possible to distinguish, by microscopic characters, between the fluid of common ascites and the fluid of ascites thrown into the peritoneum through small ulcerated apertures in the walls of an ovarian tumour, it would clear up various points in a set of cases formerly surrounded with perplexing difficulties. It would enable us to detect the pathological cause and source of the great ascitic collections sometimes attendant upon comparatively small ovarian tumours. Cases with this complication—that is, ovarian tumours with apertures allowing their secretions to pass into the general peritoneal cavity—evidently in general ran a very rapid and fatal course. If these secretions were acrid and irritating, as when mixed with inflammatory effusions from the walls of the cyst or cysts, they might at once excite fatal peritonitis. This, however, was rare, and the exception to the rule. Usually the secreted fluid appeared to be blander, distilled slowly through the morbid openings in the parietes of the tumour, and, accumulating in the peritoneum, required ever and anon to be removed from that cavity by tappings, which soon became more and more frequent, and more and more exhausting. This variety was probably, he suggested, of all ovarian cases, that most surely justifying the adoption of extirpation. And besides, in these very cases, it was generally ascertainable whether there were adhesions or not, for the tumour was surrounded by a fluid medium, and hence admitted more easily of this point of diagnosis being made out by its mobility in that medium. Perhaps it was, on the other hand, unjustifiable in our present state of knowledge to operate where there were many adhesions, or any great want of certainty about the existence and extent of them; as it was, where the tappings, though many and frequent, did not, as was seen in a few exceptional cases on record, exhaust rapidly the powers of the

patient, or threaten her life with any prospect of urgent or immediate danger.

But, admitting to their fullest extent the occasional difficulties which have been found to beset the diagnosis of ovarian tumours for operation, do we not meet with occasional difficulties of exactly the same kind in other surgical operations, and which do not yet deter surgeons from interfering? Is the trephine never used without detecting any effused blood, or pus, or depressed and fractured fragments of bone? In tying the carotid and subclavian and iliac arteries for aneurism, it has now repeatedly happened that all the great dangers of these operations had been submitted to most uselessly, the disease, during the operation or after death, being found not to be aneurismal at all,[1] and hence not at all curable by such a procedure; and when aneurismal, the operation has been sometimes left incompleted—the vessel searched for either not being secured, or, as has happened with Dupuytren and others, it has been reached and fatally transfixed with the ligature, instead of being surrounded by it. Have not the antrum, and the mamma, and the testicle, etc., been sometimes found to be the seat of simple inflammatory and curable effusion, after all the usual operative measures for the removal of supposed malignant tumours from these localities had been commenced, or even completed? A surgeon had excised ten scirrhous mammæ, and in every case with perfect success. In not one was there any return of the disease. Sir Benjamin Brodie was requested by this active operator to see a new case of scirrhus which he had determined to remove. "It was nothing more," says Sir Benjamin, "than a chronic abscess of the breast, which he denominated scirrhus."[2] Dr. S. had seen amputation of the thigh performed by a celebrated surgeon for supposed scrofulous disease of the knee-joint, and where, on examining afterwards the amputated limb, no traces of such a disease could be found. Most of them had seen cases of diseased limbs threatened with, or actually condemned to, the knife, and which yet afterwards got quite well, when surgical interference would not be submitted to by the patient. In some cases of hernia, is it not occasionally found impossible, as in some

[1] During the discussion Dr. Spittal mentioned, that out of fifty-nine cases, collected by Dr. Norris, of ligature of the subclavian artery for aneurism, "in three no aneurism existed, and in two the tumour was mistaken for aneurism and punctured." Hence, in one out of every twelve of these cases, the diagnosis was perfectly wrong.

[2] *Medical Gazette*, 1844.

cases of ovariotomy, to finish the operation, and return the bowel, in consequence of extensive morbid adhesions or other causes? Is not the stone sometimes found encysted in lithotomy, and for that or other causes its removal rendered impossible after the bladder is cut into? Is the operation for the removal of an incarcerated piece of necrosed bone not sometimes found impossible after it is begun? Grave errors have been committed in diagnosis in ovariotomy cases, in relation to the propriety and practicability of the operation, but he doubted if as grave errors were not as frequently committed in some other recognised capital operations. A much greater amount of caution was undoubtedly requisite on this head.

In summing up his statement, Dr. Simpson allowed that ovariotomy was a most serious and dangerous operation; but at the same time he maintained, that surgeons in declaiming against it had used a series of arguments, all, or almost all, of which would equally, and some of them still more strongly, apply against those capital operations for chronic maladies, regarding the propriety of which they did not affect to entertain one single doubt, and which they every day performed without the slightest scruple. For his own part, however, he entirely doubted whether surgeons should resort to many of these operations, under the circumstances in which they often adopted them. He doubted whether, for example, they should at once subject a man to all the immediate and fearful perils of lithotomy and lithotrity, because he had a stone in the bladder which gave him little or no uneasiness, and which might allow him, under proper regimen and treatment, to live and perform the duties of life for a long series of years. He doubted whether, in a case of axillary, or carotid, or popliteal aneurism, slowly increasing, or not increasing at all, having some small chance of spontaneous cure, and having no inconsiderable chance of being followed or accompanied with the same disease in other parts of the arterial system, all the dangers of the ligature of the vessel nearer the heart should be at once recklessly encountered. He doubted whether, in malignant or carcinomatous disease of the forearm or leg, amputation of the arm or thigh should be at once resorted to, with the hazard of death in a few hours or days in one out of every two operations, and the almost perfect certainty of the same morbid action reappearing sooner or later in the stump, or in some other part, if the patient did happen to survive. And, on the same principle, he doubted whether ovariotomy had not been employed in some cases under perfectly unjustifiable conditions, when the health and life of the patient were

not immediately threatened by the stage and progress of the malady, when the tumour was a source of inconvenience and deformity, rather than a source of danger, and when the evils of the disease were as yet prospective rather than real. But if the health of the patient were becoming rapidly undermined by the disease—if the progress of the affection showed that ere long it would inevitably prove fatal —if the question were thus reduced to one of certain and not distant death from the course of the malady, or *possibly* an entire escape from the affection, with prolonged life and health from the operation —and if, in addition, the ascertained or apparent freedom of the tumour from adhesions and other circumstances were such as to present no counter-indication—then he believed that ovariotomy might be undertaken under conditions far more justifiable and legitimate than the surgeon could possibly urge in favour of some of his stone, and aneurism, and other capital operations for pathological lesions of a similarly chronic character and course.

Lastly, he stated, that if betimes ovariotomy came to be recognised as a surgical operation, fit and proper in such cases of ovarian disease as he adverted to, or in others, he had no doubt the steps of the operation itself would meet with improvements. Such improvements were almost always wrought out by experience. How different is amputation now, from what it was formerly with the hot iron, or boiling pitch, to seal up the cut vessels. How comparatively safe and simple is the tying of an artery now from what it was half-a-century ago, with the flat double ligatures, and ligatures of reserve, etc. One great source of danger in ovariotomy was the irritation and injury inflicted on the intestinal canal and peritoneum from the strong ligature which was required for the stalk of the tumour being passed through the abdominal cavity, and out at the external wound—remaining there for days or weeks, and keeping a portion of the wound in the abdomen necessarily open by its presence, and, consequently, so far still more hazarding the occurrence of peritonitis. Probably it might be possible to devise some other measures of securing the large vessels, principally *veins*, be it remarked, of the pedicle, and thus save the several dangers arising, 1st, From leaving the ligature to irritate there; 2d, From the ligature, by its constriction of the stalk, producing strangulation; and 3d, From its exciting phlebitis. And if the ligature still continues to be employed, it would, he believed, be found a great improvement, as had been suggested to him by his excellent friend and assistant, Dr. Keith, to pass it down, perforate the very

thin layer of serous and mucous membranes dividing the utero-rectal reflection of the peritoneum from the upper and back part of the vagina, and bring it out along the vaginal canal. He knew that on the dead subject this could be done with the greatest facility. It would have several advantages. 1. It would enable the surgeon to close at once the whole length of the incision in the abdominal parietes; 2. The sides of the vaginal canal, being in contact, would act as a valve sufficient to prevent that dangerous access and egress of air to and from the peritoneum under strong respiration, vomiting, etc., which had sometimes occurred through the aperture kept open by the ligature, in the old form of operating; 3. The ligature would not pass through the same extent of the peritoneal cavity, and would scarcely, if at all, touch or irritate the folds of the intestinal canal; and 4. If the uterus happened to be displaced backwards upon the rectum, the ligature applied to the posterior surface of its broad ligament would be included and imbedded in a cavity almost divided and separated from the general cavity of the peritoneum, and where the process of reparation and adhesion might often go on without fatally extending upwards into the general peritoneal sac. Farther, the cases already published recounted some errors which the experience derived from them showed might be avoided in future. We were thus warned to take great care to close, as accurately as possible, the peritoneal side of the wound, to prevent strangulation of a fold of intestine in its edges; to adopt precautions with the same view, of not allowing a similar effect from the portion of ligature passing through the abdomen; not to allow the bladder to become distended, lest it drag upon the uterus, or disturb the reparative process; not to excite inflammation by dragging at the ligatures, etc. etc.

Dr. Simpson subsequently added a few observations in reply to some remarks made by Mr. Spence. According to Mr. Spence, trephining for the discovery of effused blood, and tying the arteria innominata, were not now looked upon by surgeons as justifiable operations. Probably, the Society would allow that the lately published text-books by Professors Fergusson and Syme were fair standards of the existing state of British surgery. Now, Mr. Fergusson not only in his work advises trepanning for effused blood, but even speaks of cutting through the dura mater in search of it. Mr. Syme, in treating of the ligature of the innominata, states that it is a dangerous operation, but he does not give the most remote hint as to its being regarded by him or others as an unjustifiable one;

and, on the contrary, he describes the steps of the operation, and suggests means for rendering it safer. Mr. Spence had alluded to the spontaneous cure of aneurism, and thought him wrong in his ideas about its frequency. Dr. S. did not know of any data calculated to show how often, or how seldom, the spontaneous cure of a *local circumscribed aneurism*—such as surgeons operated for—might be expected; but of eight or ten cases of popliteal aneurism, seen in the hospital within as many years, nature set up inflammatory action in the sac or vessel, or both, and cured one case, a patient of Dr. Cunningham, before art had an opportunity of interfering. At all events, he felt assured, that if local external aneurisms were treated by common palliative measures, their spontaneous cure would be found not to be so rare as the spontaneous cure of ovarian dropsy; and he feared that all Mr. Spence's arguments for early operation in the one case, most unwittingly applied with similar appropriateness to the other.

PAINFUL MUSCULAR AND FASCIAL CONTRACTIONS ALONG THE VAGINAL CANAL—VAGINODYNIA.[1]

Professor Simpson said that he had lately seen a number of cases, and he had seen them from time to time for years, where painful muscular or fascial contractile bands existed in the sides or along the course of the vagina. He had known some of these cases to have been mistaken and treated for various alleged affections of the uterus or its appendages. The pains complained of were, sometimes, principally sympathetic or reflex, and referred to the uterus or other parts, and often aggravated by all movements calling the pelvic muscles into action. He had under his care at present a patient whose chief complaint was a constant disagreeable pain in the sacral region; another who had the same severe kind of pain in the left iliac region; while a third could not walk because of the pain which she felt in the pelvis whenever progression was attempted. In this class of cases the uterus and ovaries would, on careful examination, be found healthy, but a tense, corded, transverse band could be felt at some part of the vaginal wall, and usually, if not always, on one side of it, and placed, as it were, more or less deeply beneath or

[1] See Proceedings of Edinburgh Obstetrical Society, November 14, 1860, in *Edinburgh Medical Journal*, December 1861, p. 594.

below the mucous membrane. The band or cord was most commonly placed about an inch above the vaginal orifice. It varied considerably both in thickness and tenseness in different cases. When the cord was touched and stretched with the finger, the patient complained of more or less severe suffering; and this was the pathognomonic mark of the disease. Sometimes the patient only experienced pain at all when the vagina was touched; and these cases usually came under treatment in consequence of being unable to submit to marital intercourse. He had one patient under treatment who could not bear at first to allow herself to be examined vaginally without chloroform, because of the pain experienced from the touch of the finger. Painful and distressing as these cases were, they were very amenable to treatment,—division or rupture of the tight and contracted band being usually sufficient to afford complete, and often instantaneous, relief; and in the milder form of cases, sedative applications were sometimes sufficient. The method he had usually adopted for the cure of very severe cases of this kind was, after chloroforming the patient, to divide the tight band by means of a tenotomy-knife introduced underneath the vaginal mucous membrane. It was a bloodless operation, and had never been attended with any worse consequences than the formation of a thrombus, which had taken place in one patient and had delayed her recovery. He had tried also to effect the object of stretching or rupturing the band by dilating the vagina forcibly with the fingers, whilst the patient was asleep with chloroform. The principle of cure was the same as that employed for the relief of fissure and spasmodic contraction of the orifice of the rectum. But less severe means were occasionally successful. Patients afflicted with this complaint were usually relieved, and sometimes cured, by the daily introduction into the vagina, for a length of time, of local sedatives, such as belladonna ointment and chloroform. A small cup-like indentation was made with the finger in an ordinary belladonna pessary; a few drops of chloroform having been poured in, and then shut in by putting a piece of ointment over the orifice, and then the whole was introduced into the vagina, where the ointment slowly dissolved, and became absorbed along with the chloroform. As to the probable nature of these painful contractions, he (Dr. Simpson) could not supply any very definite answer, but he thought they depended in different cases either, first, on a kind of permanent spasm of some of the muscular fibres around the vagina, of the same nature as the spasm of the sterno-cleido-mastoid muscle, which pro-

duces torticollis; or, secondly, they were due to contractions going on slowly in some portions of the pelvic fascia, perhaps resulting from a kind of subacute inflammation, and resembling those often painful contractions of the palmar fascia, which are the acknowledged cause of "crooked-in fingers." Dr. S. believed that the common anatomical seats of these painful vaginal contractions were either in the bundle of muscular fibres forming the anterior border of the levator ani, or in the duplicatures or edges of the pelvic or recto-vesical fascia at the points where the vaginal canal perforates the fascia and receives insertions and prolongations from it. These contractions sometimes appeared in patients in whom no previous disorder of any of the pelvic organs could be ascertained to have existed; and he had lately seen one patient who was the subject of it, and who had never been able to allow her husband to approach her, so that in her the morbid condition must have been present before marriage, although she had never been in a position to be made aware of its existence. Instances, however, like this last oftener belonged to a class of cases where apparently the stricture was not, as in the preceding class, in the course of the vaginal canal, but was situated at its very orifice, independently apparently, in most, of all disease there except supersensibility and spasm of the sphincter of the vagina, but traceable in others to hyperæsthesia of the mucous surfaces of the vulva or vagina, resulting from irritable eruptions or other morbid states of these mucous surfaces.

ON VESICO-UTERINE, VESICO-INTESTINAL, AND UTERO-INTESTINAL FISTULÆ,

AS RESULTS OF PELVIC ABSCESS.[1]

Cellular tissue exists abundantly within the pelvis, along the lining of the walls of the pelvic cavity, within the layers of the broad ligament, and between the intestinal, genital, and urinary canals, at all those points in which they come into organic coherence. Inflammation of this tissue, or Pelvic Cellulitis, is a common affection, particularly as a consequence of parturition, etc. Pelvic cellulitis, after giving rise to great swelling and induration, by the effusion of serum, coagulable lymph, etc., into the inflamed portion of the cellular tissue, very often terminates sooner or later in resolution;—

[1] See *Edinburgh Monthly Journal of Medical Science*, December 1852, p. 532.

the disease not unfrequently assuming a subacute or chronic type. In other instances, however, the inflammatory action runs on towards suppuration, and forms a so-called Pelvic Abscess. When this termination occurs, the collected purulent matter is found to obtain egress by different outlets. The abscess sometimes bursts into the intestinal canal, or into the genital canal, or into the urinary bladder. Occasionally it discharges externally upon the cutaneous surface; and in a few rare instances it opens into the cavity of the peritoneum. Sometimes the collected pus is found to make its escape simultaneously, or rather consecutively, by *two* different exits. Thus we may have the cavity of the same abscess opening into two different pelvic mucous canals. Where such *double* perforations, originating in the escape of matter from a pelvic abscess, become chronic in their character, they lead to the formation of several species of deep pelvic fistulæ, which have not, so far as I am aware, been hitherto described by obstetric pathologists.

Very few instances of the existence of fistulæ of any kind between the bladder and uterus have hitherto been put upon record. Indeed, the number of *vesico-uterine* fistulæ hitherto recorded seems to be limited to three instances, reported severally by Mad. Lachapelle, Professor Stoltz, and M. Jobert; and in all of these three cases, the perforation which existed between the bladder and cavity of the neck of the uterus was the result of injury during parturition.

In the following case this rare form of lesion was produced as a consequence of pelvic cellulitis; or, to speak more definitely, it was produced by a purulent collection formed in the cellular tissue lying between the bladder and the neck of the uterus, and which ultimately ruptured—on one side into the bladder, and on the other side into the cavity of the uterus, or rather the cavity of the cervix uteri.

Case I.—The patient, aged 22, and the mother of two children, was admitted into the female ward of the Royal Infirmary in June last. Her youngest child was then eleven months old; and she had made a perfect recovery after her confinement with it. About six months, however, subsequently to her delivery, she was seized with local pelvic pain, dysuria, and the usual symptoms of pelvic cellular inflammation. Three or four weeks after the commencement of this attack she had shiverings and perspirations, and other symptoms of hectic fever. These symptoms were shortly followed by evidence of the escape of purulent matter; and subsequently complete incontinence of urine came on. After this the urine continued to be discharged per vaginam up to the date of her admission into the hospital, four months after the commencement of the inflammatory symptoms. The urine contained a considerable quantity of pus. On examination, the urethra was found perfectly patent, although the urinary secretion was not discharged

through it. There was still a considerable mass of fixed inflammatory deposit in front of the cervix uteri, or in the cellular tissue between it and the posterior wall of the bladder. The cervix uteri itself was considerably hypertrophied, particularly its anterior lip. That the urine passed from the bladder through the os and cervix uteri, was ascertained by the simple experiment of filling up the os uteri for a day with a small sponge-tent. During the time the cavity of the os uteri was stopped up with this plug, the urinary discharge was evacuated through the urethra ; but immediately began again, and continued, to pass through the artificial vesico-uterine opening as soon as the sponge plug was withdrawn. After withdrawing the plug, the cervical cavity, which had been dilated by its presence, was examined by the finger, and two apertures were found passing into it, or rather leading from it—the normal aperture leading upwards into the cavity of the uterus, as ascertained by the uterine sound—the other, tending obliquely forwards towards the cavity of the bladder. This latter artificial opening was freely cauterised by solid nitrate of silver. Subsequently, local and general measures were employed, as external counter-irritation, iodine, etc., to promote the absorption of the inflammatory deposit. In the course of a few weeks the swelling from the deposit between the bladder and cervix uteri diminished, the incontinence of urine became gradually lessened, and was ultimately totally arrested ; the cure being, as I believe, the result of the natural contraction of the parts, following upon the absorption of the original inflammatory deposit. Subsequently this poor patient was attacked with symptoms of acute pulmonary phthisis, and died a short time ago at a distance in the country, but without any return whatever of the incontinence of urine.

I have seen other cases of pelvic cellulitis which had run on to suppuration, leave other forms of fistulous perforation, perhaps still more strange and singular in their anatomical relations.

Two years ago, I had under my care a case in which there was produced, as the result of this disease, a *utero-intestinal* fistula.

Case II.—A lady, a few days after her first confinement, was attacked with symptoms of fever, and local pelvic inflammation. These terminated in a very tedious pelvic abscess. About a year subsequent to her accouchement, she was brought to Edinburgh, and placed for some time under my care. She still had considerable thickening and pain on pressure in the left side of the pelvis, which had been the seat of the pelvic cellulitis. The cervix uteri, and indeed the whole uterus was elevated upwards, and drawn considerably to the same side. On examining simultaneously, with the fingers of the right hand on the roof of the vagina, and with those of the left hand placed externally over the left iliac region, much thickening and agglutination of the uterus and intestines could be readily ascertained in the left pelvic and iliac regions. Discharges of slight accumulations of pus recurred from time to time through the os uteri ; and, occasionally, after these discharges, small quantities of feculent matter were found in the vagina—showing a communication to exist between the intestinal canal, at some part, perhaps the sigmoid flexure, and the cavity of the uterus. When the canal of the cervix uteri was gently examined by a slender probe or sound, a fistulous communication could be traced, passing up from the cavity of the cervix laterally towards the left iliac region ; but this sinus could not be followed for any great length.

In this case there was a constant tendency to the recurrence of inflammatory attacks in the original seat of the pelvic inflammation, some of which were extremely severe. The patient subsequently removed to the south of England, where she died under, I believe, one of these renewed inflammatory attacks. My friend, Professor Lawrie of Glasgow, saw this case repeatedly.

Some time since, I was consulted by a patient, in whom there existed a still more rare and curious form of fistula, the result of a pelvic abscess under which she had suffered. Professor Macfarlane of Glasgow, and Dr. Miller of London, also saw the case. Its peculiarity consisted in this—that, as a result of pelvic abscess, a fistula was formed between the bladder and rectum—a *recto-vesical* fistula —and yet the intermediate uterine and vaginal canals were not implicated in it. The principal particulars regarding the case are as follow:—

Case III.—The patient, when about twenty-three years of age, and unmarried, was attacked with fever and severe local inflammatory pain in the pelvis and left groin. After these symptoms had continued for some weeks, she was at length relieved by the discharge of a large quantity of purulent matter from the rectum. About twelve months after the occurrence of this pelvic abscess, she was considered so well as to be allowed to be married. But from that time she suffered from repeated attacks of pelvic irritation and inflammation, with leucorrhœa, irregular menstruation, etc. She never became pregnant. Several years subsequent to marriage, during one of these recurrent pelvic attacks, the bladder became greatly irritated ; and, after this painful dysuria had lasted for some time, purulent matter was discharged along with the urine. Subsequently to this period, and on to the time of her death, four years afterwards, small portions of feculent matter and flatus passed from time to time by the urethra, along with the urine—showing a communication to exist between the intestinal and urinary canals. As high up the rectum as could be reached with the finger, a fistulous opening was traceable in the anterior and lateral part of the bowel, and a probe could be passed forwards to some extent through it. There was much thickening and agglutination of the pelvic tissues at that part. No treatment was of any avail in relieving the patient from her distressing symptoms. She died ultimately of a short illness, from, as reported to me by Dr. Miller, some affection of the brain.

In the preceding and in other cases of pelvic abscess, the different openings through which the matter becomes discharged do not, as I have already remarked, always occur simultaneously, but generally consecutively. After the purulent matter has escaped, apparently with sufficient freedom, by one opening, it will occasionally, in consequence either of its temporary obstruction and retention in the sac of the abscess, or in consequence of the walls of the abscess

themselves ulcerating, again open at a subsequent period into another canal. The following case, which I had occasion to see often under the kind and able care of Dr. Johnson of Stirling, will serve to illustrate this remark:—

Case IV.—A patient in the country was seized with acute symptoms of pelvic cellulitis; and a large inflammatory tumour speedily formed in the cellular tissue of the left broad ligament, and in the left iliac fossa. In despite of the active antiphlogistic treatment that was adopted, the disease ran on towards suppuration, and dangerous symptoms of irritative fever and exhaustion supervened, with great local tenderness in the affected part. An exploring needle, introduced by the spine of the ilium into the inflammatory swelling, lying in the iliac fossa, showed the presence of a deep collection of pus. I evacuated it twice by a trocar, with great relief to the patient. Pus continued to be freely discharged for a considerable time through this artificial opening on the edge of the left iliac fossa. After this discharge had gone on for some weeks, the opening from time to time offering to become nearly closed, a new and distressing symptom supervened. For, along with a discharge of matter through the artificial opening, there passed from time to time some flatus, and occasionally a slight appearance of feculent matter—showing that the abscess had ulcerated into the bowel, probably the sigmoid flexure of the colon.

In this instance, the spontaneous opening of the abscess into the intestinal canal did not, as I have said, occur till weeks subsequent to the discharge of the matter through the external opening. After this occurrence, the external fistula was attempted to be shut up by various means, but for some time without avail. At last, by altering the position of the external orifice by a new incision, the whole external aperture was happily obliterated, and the patient has made a perfect recovery.

In the preceding cases, the fistulous communications resulting from the pelvic abscess were probably valvular in their form, inasmuch as apparently the fluids and air escaped through the track of the fistula only occasionally, and not constantly. Perhaps, in some, the transit of these matters was only effected when the canal of the fistula was preternaturally distended by an accumulation within and behind it of the morbid matters that passed; the walls of the canal at other times being so much in contact as not to allow of the passage of any foreign body.

In the case of vesico-intestinal fistula which I have mentioned—(see Case III.)—feculent matter and flatus appeared to pass from the bowel into the bladder; but the patient was never aware of the urine passing from the bladder backward into the bowel. It is quite possible, however, that it may occasionally have done so in

small quantity, without her being able to recognise it distinctly. If it were not so, then, in that case, the fistulous communication was of such a valvular structure as to allow of the transit of matters in one direction, and not in another—a point in its anatomy which it is not difficult to conceive.

Since the preceding notes were written, I have received a communication from an old pupil, Dr. Heslop, directing my attention to a case published by him,[1] in which the left ovary was found after death of the size of an orange, adhering intimately to the rectum and bladder. The cavity of the enlarged ovary contained "a soft, pultaceous, half fæcal, half caseous-looking matter;" and communicated posteriorly with the lower portion of the sigmoid flexure of the colon, and anteriorly with the urinary bladder. In this case a fistulous communication seemed to be formed between the intestinal and urinary canals, through the cavity of this diseased ovary; and air, and probably feculent matter, are said to have passed occasionally from the bladder for twelve months before death. The patient had, in addition, a calculus in the left kidney, enlargement of the liver, etc.

BALL-VALVE OBSTRUCTION OF THE RECTUM BY SCYBALOUS MASSES.[2]

Dr. Simpson described a recent case of this not uncommon complication which he had seen with Dr. Husband. The patient, when Dr. Simpson visited her, was suffering from intermitting paroxysms of abdominal muscular effort, like those of labour. Dr. H., on making a vaginal examination, had detected the impacted and distended state of the rectum. A large, hard, oblong scybalous mass filled up the canal of the rectum. It was incrusted with phosphatic deposit on its external surface. The rectum was in consequence irritated by it, and tender under examination. The patient was chloroformed, the mass broken down by an iron instrument, and with some difficulty removed piecemeal. Subsequently, some smaller and higher-placed masses were expelled by the action of aperients, and the patient was relieved from her sufferings.

[1] *Dublin Quarterly Journal* for 1850, p. 220.

[2] See Proceedings of Edinburgh Obstetric Society, January 10, 1849, in *Edinburgh Monthly Journal of Medical Science*, April 1849, p. 705.

Dr. Simpson alluded to some other cases of the same kind which he had seen. Such ball-valve obstructions often caused great distress to the patient; and the disease was occasionally altogether overlooked for a time, and its nature mistaken. This was more particularly liable to happen in consequence of the circumstance, that a small quantity of thin feculent matter often escaped from day to day in these cases, leading to the idea that the uneasy sensations of the patient, and ultimately the paroxysmal and expulsive pains, could not be the result of obstruction in the bowel. Thin feculent matter in this way escaped, in consequence of the scybalous mass not necessarily occupying and shutting up the whole calibre of the bowel, but allowing the more fluid matter to pass between its surface and the sides of the intestinal canal. When, however, the patient used, as was instinctively done, any straining effort to make the expulsion more complete, the scybalous mass was by this means pushed down upon the lower and more contracted portion of the rectum, and acted exactly like a *ball-valve*, so far temporarily closing the bowel, and preventing any further evacuation from it for the time. Such patients could sometimes partially evacuate the bowel in a lying, when they could not effect it in a sitting, posture, a result easily understood when we consider the mechanical character of the disease. It was an affection liable to recur from time to time in those who had been once subject to it.

ON INFRA-MAMMARY PAINS.[1]

A local limited pain under the left mamma, more rarely under the right, is a species of suffering which is not unfrequently seen in the female sex, and it has been alluded to and described by various authors. Usually the seat of the pain is limited to a part not more extensive than a crown-piece. Sometimes it spreads further, and circularly around the side. It is apparently seated in the soft parts covering the ribs, and principally in the integumental coverings. Often it co-exists with uterine disease. Sometimes it persists for weeks, months, and years, occasionally recurring in fits, more generally of a chronic and more permanent nature. Many means have been suggested for its relief and treatment; as cupping and

[1] See Proceedings of Edinburgh Obstetrical Society, Session XVI., in *Edinburgh Medical Journal*, April 1857, p. 965.

counter-irritating the corresponding portion of the vertebral column; applying leeches, blisters, sedatives, etc., to the affected part. Latterly, in a considerable number of instances, I have injected the subcutaneous tissue at the pained part with ten or twenty drops of the common solution of the muriate of morphia, or with a watery solution of the bimeconate of morphia, of the same strength, according to the plan ingeniously suggested by Dr. Alex. Wood for the cure of neuralgia. The results have been in most cases successful beyond my previous hopes. I have seen the pain at once disappear in a number of instances in which it had previously persisted for various lengths of time. In most a single morphia injection has sufficed; in some it required to be repeated twice or oftener. The instances which have not yielded to this treatment have been relatively very few in number, compared to those in which it has succeeded; and the measure is so simple and so generally effectual as, I believe, to deserve the attention of the Society.

SPURIOUS PREGNANCY—ITS FREQUENCY AND NATURE.[1]

A case of hysteria and spurious pregnancy having been read by Dr. Keiller before the Medico-Chirurgical Society of Edinburgh, the president, Dr. Simpson, observed that he believed cases of spurious pregnancy were often met with in practice; for many a married lady would acknowledge, when questioned, that she had once or twice thought herself pregnant when, as the result showed, she was not. He had in his own practice seen several cases in which ladies had removed into town with their entire establishments, in the full belief of their approaching confinement, and where he had had the disagreeable duty of informing them that they were not in the family way. Shortly before his predecessor, Dr. Hamilton, died, one lady, in her anxiety to reach Edinburgh, had had the roads cleared of snow for a long series of miles, to enable her to accomplish the journey, which proved after all a useless one, as Dr. Hamilton pronounced her not pregnant. These were instances in which patients progressed onwards to near the full term of pregnancy, suffering all the usual symptoms and discomforts of that state. Sometimes phenomena exactly like those of labour came on at the full term. This seemed

[1] See Proceedings of Medico-Chirurgical Society of Edinburgh, April 5, 1854, in *Association Medical Journal*, April 21, 1854, p. 357.

to have occurred in Dr. Keiller's patient. He had seen several analogous instances of spurious pregnancy terminating in spurious parturition. In one of the first cases of this kind which he had witnessed, and which occurred in the Maternity Hospital of Edinburgh, he had been suddenly called from lecture to see it; the case being reported by the house-surgeon, a man of remarkable acuteness, to be one of placenta prævia, and requiring the operation of turning. The patient had the phenomena of labour present, with severe menorrhagia; but there was no child to turn, as she was not pregnant. Besides the cases of pseudo-pregnancy in which, as in the above, the patient went on with the usual symptoms of pregnancy till near or up to the full period of labour, there were other varieties of this curious morbid state. In some, for example, the affection lasted only for a few months; in others, it occasionally continued far beyond nine months, and became, as it were, chronic in its character. As to the symptoms themselves, they consisted of the presence of more or fewer of all the usual sympathetic symptoms of pregnancy, as swelling of the abdomen, nausea and sickness, a feeling of quickening and motion of the child, etc. Dr. Keiller had stated that the mammary signs were not well marked in his patient. Sometimes, however, they were; and he had sketches illustrative of this fact, executed by the patient herself during a state of spurious pregnancy, and in whom, in a subsequent veritable pregnancy, her first, the areolæ did not present a deeper tint than they had done during her pseudo-pregnancy. As to the sensations which had been described in such cases, they were very frequent, and sometimes there were true motory contractions in the abdominal walls. He saw, about a year ago, with Drs. Moir and Weir, a patient who had been sent from the country on account of a supposed difficulty in the delivery, the woman having, according to her statement, been in labour for three days. In this case there were very strong motions visible in the abdominal walls; so much so that the husband, who was present during the consultation, declared, on their affirming that there was no child, that then there must be an animal inside his wife. Dr. Simpson was inclined to believe that the malady was connected with the ovary. In one aggravated case which had fallen under his observation, there was marked ovaritis, and the ovary subsequently suppurated. Again, it was observed that, although menstruation did occur in the cases which had been noticed, yet that it was much scantier than usual, and sometimes the catamenia were wanting for several months. It was well known that the complaint was not

peculiar to the human female. Harvey had long ago remarked that in hounds who were well fed, many of the phenomena of pregnancy, such as swelling of the abdomen, and the presence of milk in the mammæ, occurred both subsequently to unsuccessful sexual intercourse, and also frequently after seasons of heat, during which there was no intercourse with the male; kittens and other young animals were frequently stolen by the animal, to make the semblance of a litter. The curious observation had also been made by Harvey, that the animals were liable to the diseases of bitches which had recently been delivered. Dr. Simpson stated some similar facts in the case of the domestic cow. The symptoms of spurious pregnancy often occurred in the virgin female dog. And he believed that, when some of the cases of the so-called hysteria in unmarried females were inquired into, they would be found, as he thought he had repeatedly seen, to be really symptoms only of spurious pregnancy. Dr. Keiller had alluded to retraction of the limb as having been a well-marked symptom in his patient. He himself had seen a case many years before the introduction of chloroform, in which the symptom was a prominent one. The lady had been under treatment in Paris, and, on her return to Scotland, a surgeon examined her, and recognised, as he supposed, the presence of a large ovarian tumour — not an uncommon mistake, as, in the records of ovariotomy, six cases are detailed in which no tumour could be found after the abdomen was opened. Dr. Simpson was consulted, and, on percussing, he found the abdomen quite tympanitic, and of course negatived the tapping, and the presence of any ovarian tumour. The leg in this case was much drawn up, and he was informed that, while in Paris, the heel was for a time closely applied to the back of the neck. About two years ago, he saw a lady, with Mr. Syme, whose limb was strongly and permanently retracted, and presented the appearance of hip-disease. He was uncertain whether there was abdominal fulness in this case, or not. The appearances were so deceptive, that a practitioner had used the exploring needle for the purpose of evacuating matter. As soon as the patient was brought under the influence of chloroform, however, the limb was readily straightened for the first time for many long months, and the case was at once ascertained to be one of "hysterical disease" of the joint. With regard to the nature of the abdominal swelling in spurious pregnancy, he had tried various experiments to ascertain its cause, but in vain; and as yet he could come to no decided conclusion on the subject. It had been sug-

gested that, while the patient was deeply under the influence of chloroform, contained air escaped unobserved; but, in one very marked case in the hospital, he had passed a tube per anum, its nozzle being kept under water; but not a bubble of air escaped. The diaphragm he was inclined to suspect to be a chief agent in the production of the swelling. One patient who had a small fibrous tumour of the uterus, and a rounded tympanitic abdomen, could greatly diminish the prominence of the abdomen by drawing herself up, and, on allowing the diaphragm to fall, the fulness and the appearance of pregnancy returned. The chloroform, he believed, here acted by relieving the muscles, diaphragmatic and abdominal, from the influence of reflex action, and permitting their relaxation. In one case, he had also seen the Cæsarean section proposed, though in somewhat different circumstances from the case of Dr. Keiller. The patient was dying from another disease, but spurious pregnancy was present; she was positive about the child's being alive, and he had been asked to operate after the mother's death to save the child. On a vaginal examination, etc., the uterus was found small and unimpregnated. The idea of some living animal being contained within the abdomen, in such cases as in Dr. Keiller's patient, was not unfrequent. On two or three occasions such a belief had been expressed to himself. Dr. Keiller had classed the interesting case which he had communicated under the head of hysteria; but some of the cases to which he himself had alluded could scarcely be properly included under that designation. The phenomena were common to the females of our domestic quadrupeds, and in them would not be designated hysteria. Dr. Simpson suggested that a series of experiments should be made on the bitch during the occurrence of the anomalous pregnancy, to ascertain, by examination of the state of the ovaries and uterus, the true nature of the cause. He thought that some cases of membranous dysmenorrhœa might be referred to the same category as the one under consideration; for in some patients, besides the throwing off of a membranous structure or maternal decidua, the other constitutional symptoms were also present. In some cases, the similarity to true pregnancy was very marked even in special and minor details. In a case from Ayrshire, which he had lately seen with Dr. Taylor, a peculiar eruption of intense prurigo was present, which the patient declared had hitherto only appeared when she was really pregnant. He concluded by asking if any member could suggest a rationale of the occurrence of the abdominal swelling, or explain the peculiar effect produced upon it by the inhalation of chloroform.

Dr. Simpson had made some experiments on the subject in the wards of the hospital, and had satisfactorily ascertained that, in the cases he had examined, the prominence of the abdomen did not depend upon any arching of the spine.

ON THE ALLEGED INFECUNDITY OF FEMALES BORN CO-TWIN WITH MALES.

WITH SOME NOTES ON THE AVERAGE PROPORTION OF MARRIAGES WITHOUT ISSUE IN GENERAL SOCIETY.[1]

"It is," says Dr. Burns, "a popular opinion, and I do not know any instance to discountenance it, that if twins be of different sexes the female is sterile."—"I have never," he adds, "had an opportunity of examining the state of the uterus and its appendages after death."[2]

Some years ago I took considerable pains to collect a series of data for the purpose of testing the validity of the opinion alluded to by Dr. Burns in the preceding paragraph. The results of the inquiry were, in 1839, laid before the Edinburgh Medico-Chirurgical Society in the following form.[3] I venture to publish the observations now, with a few additions and corrections, under the idea that the subject is not devoid of interest in relation to physiology and legal medicine, and involves one or two correlative questions worthy of some degree of investigation. Besides, I know well the many difficulties connected with a statistical inquiry like the present, however brief and simple it may appear when condensed into its ultimate results; and the publication of the evidence that I have obtained upon the topics in view may probably be fortunate enough to save others from expending time and trouble upon the same research.

ON THE REPRODUCTIVE POWERS OF FEMALES BORN CO-TWIN WITH MALES AMONG OUR DOMESTIC UNIPAROUS ANIMALS, AND IN THE HUMAN SUBJECT.

Mr. John Hunter, in an essay read before the Royal Society of London in 1779, and afterwards published both in the *Philosophical*

[1] See *Edinburgh Medical and Surgical Journal*, January 1844, p. 107.

[2] See the last edition (1843) of his well-known *Principles of Midwifery*, p. 236.

[3] In an article on Hermaphroditism in Dr. Todd's *Cyclopædia of Anatomy*, part xvi. (1839), p. 736, I have stated some of the results of the earlier part of this inquiry.

Transactions for that year, and in his work on the *Animal Economy*, showed that, when among black cattle the cow brings forth a male and female at the same birth, the male is a perfect bull calf, but the apparent female is almost always imperfect in its sexual organisation. Female cattle of this kind, born co-twin with males, have long been distinguished in this country under the name of free-martins. In external appearance and form of body they usually resemble the ox and spayed heifer more than either the entire male or entire female of the species. They commonly grow to a larger size than either the bull or the cow, and have horns like those of an ox, and a tone of bellowing similar to his, with the same marked disposition to become fat under the use of nourishing food. In general they do not show any sexual desire for the bull, or the bull for them.

The defective sexual conformation of free-martin cattle is attested, not only by the observation of their sterility during life, but also by the anatomical examination of their reproductive organs. Mr. Hunter had an opportunity of dissecting several free-martin cows. In all of them the external sexual organs were of the female type—the vulva and os vaginæ being in general well developed. The vaginal canal, however, was contracted at its upper part, and the internal female organs, the uterus, Fallopian tubes, and ovaries, were altogether rudimentary and imperfect in their structure. In some there was an apparent superaddition of male organs, testes and vasa deferentia, probably from a permanence of the Wolffian bodies and ducts of the early embryo ; and in one case the ovaries were replaced by bodies having all the external characters of male testicles.

Mr. Hunter's observations have been since corroborated by additional cases and dissections made by Scarpa,[1] Gurlt,[2] and Allnatt.[3] I have myself had an opportunity of dissecting the sexual parts of two adults and a third young free-martin, killed in the shambles of this city, and have found all of them formed after the anormal and imperfect sexual type pointed out by Mr. Hunter.[4] My friend Dr. Allen Thomson made some years ago a similar observation upon a free-martin twin fœtal calf.

The butchers in Edinburgh and its neighbourhood, of a number

[1] *Mem. della Societa Italiana*, tom. ii. p. 846.

[2] *Lehrbuch der Pathologischen Anatomie der Häus-Saugethiere*, Bd. ii. s. 188. Tab. xxi. Fig. 2, 3, and 4.

[3] *London Medical Gazette*, vol. xviii. p. 528.

[4] I have described at length the particular anatomical appearances met with in these cases in Dr. Todd's *Cyclopædia of Anatomy*, vol. i. pp. 702 and 707.

of whom I have made inquiries upon the subject, seem to be perfectly familiar with the fact, that in the free-martin, whose flesh they usually reckon of a superior quality, the womb, or calf-bed, as they term it, is in almost all cases apparently wanting; and all our intelligent agriculturists in the Lothians are acquainted with the sterile character of these animals.

Though we are certainly indebted to the sagacity of Mr. Hunter for first fully appreciating the value of the physiological sexual anomaly observed in free-martins, and for confirming the fact by accurate anatomical investigation, yet it is but proper to mention that the circumstance itself of the infecundity of the free-martin cow has long, as was indeed pointed out by Mr. Hunter himself, been notorious among agriculturists in Great Britain, and is prominently mentioned by Leslie, and some of the older authors on husbandry.

Indeed, the Roman agriculturists seem not to have been unacquainted with the variety of barren female cattle under consideration; or at least their attention appears to have been so often attracted by cases of sterility in the cow, that they found it a matter of convenience to employ, as we do, for their designation and distinction, a specific noun, and named them *Taurœ*. Thus Varro in his work *De Re Rusticâ*, tells us "Quæ sterilis est vacca *taura* appellatur;"[1] and Columella, in speaking of the sorting (*delectus*) of the flock, directs that "those which have brought forth, and the old cows which have ceased to breed are to be removed, and so also the *taurœ*, which occupy the place of fertile cattle, are to be set aside, or to be trained to the plough, since they are not by their sterility rendered less fit for labour than the common heifer."[2] There is no direct evidence, however, to show that the Romans were aware of the particular circumstances, in respect of plural births, under which such *taurœ* were produced.

Though the infecundity of free-martin cows be a very general fact, still it is by no means a universal one. Mr. Hunter, in his original essay on the subject, mentions that in one instance, in examining a free-martin that died when about a month old, he found all the organs of generation well formed. After stating this case,

[1] *Libri de Rusticâ Catonis, Varronis, Columellæ*, etc., Paris Edit. (Liber ii.) p. 82.

[2] Enixæ et vetustæ quæ gignere desierint summovendæ sunt, et utique *taurœ*, quæ locum fœcundarum occupant, ablegandæ, vel aratro domandæ, quoniam laboris et operis non minus quam juvencæ, propter uteri sterilitatem patientes sunt.—*Ibid.* lib. vi. cap. xxii. p. 232.

he adds, "I have heard of other twin cows breeding; but as I cannot call to mind the names of the individuals who communicated the circumstances to me, I have only mentioned one of undoubted authority."

An anonymous author in the *Farmers' Magazine* for November 1806,[1] has described such an instance in a free-martin belonging to Mr. Buchan of Killintringham. This cow was well made and a good milker; she produced one calf. The same gentleman, Mr. Buchan, had a second free-martin which never bred. Another writer in the same Magazine for November 1807, makes the following statements:—"On the 11th of November 1804, a cow of mine brought forth two calves, one a bull, and the other a cow calf; and in spring last the female twin produced a very good male calf; yet a neighbour of mine assures me that a female twin belonging to him would never take the bull, and was sold on that account to the butcher at the age of four or five." Dr. Moulson of Halifax mentions, in Loudon's *Magazine*,[2] the case of a free-martin cow reared by Joseph Holroyd, Esq., of Withers, near Leeds, which copulated with its own twin bull. "In due time," he adds, "the heifer brought forth a bull calf, and she regularly had calves for six or seven years afterwards."

In the course of making some inquiries in West Lothian after cases of free-martin cows, I have become acquainted with two well-authenticated instances in which these animals proved capable of propagating. One of these cases occurred some years ago at Newton, near Queensferry. The second was reared by Mrs. Cochran of Stewartsfield, Broxburn, and produced several calves. Such exceptional cases, however, as those to which I have alluded, appear, on the whole, to be comparatively so rare in their occurrence, as not to invalidate the generality of the fact with regard to the sterility of the free-martin twin cow, and render it a question of interesting inquiry, whether this law of infecundity in the female of male and female co-twins be confined only to plural conceptions among black-cattle, or extends also to twins among other species of uniparous animals.

In reference to the females of opposite-sexed twins among sheep, I have been assured from different quarters that the law of the sexual imperfection and infecundity of the free-martin cow does not hold good with respect to them. Several varieties of sheep, particularly some of those belonging to the white-faced breeds,

[1] See Youatt *On Cattle*, p. 539. [2] *Magazine of Natural History*, vol. v. p. 765.

produce twins with such constancy that we may truly consider this as one of their occasional hereditary characters. These twins are not unfrequently of different sexes, and yet instances of sterility are rarely if ever observed among such flocks.[1]

I have not been able to learn how the matter stands with regard to twins among goats, not having access in this district of the country to any information or direct observation upon the subject in that animal.

I have hitherto been equally unsuccessful in tracing out any instance of a twin mare or she-ass, born under the circumstance already pointed out, being reared to maturity. The mare, indeed, appears only in extremely rare cases to produce twins, and these twins are almost always endowed with such feeble powers of life as seldom to survive for any length of time after birth.

Sir Everard Home, in a paper "On Animals preternaturally formed at the time of birth," inserted in the *Philosophical Transactions* for 1799, and in the third volume of his *Comparative Anatomy*, after assuming that certain sexual organs in the male and female are originally identical or neuter in their character, and are only afterwards changed to the male or female type according to ulterior circumstances, adds the following observations:—"If it is allowed that the sex is impressed upon the ovum at the time of impregnation, it may in some measure account for the free-martins occurring when two young are to be impressed with different sexes at one impregnation, which must be a less simple operation, and, therefore, more liable to a partial failure, than when two or any greater number of ova are impressed with the same sex."

"It may also account," he remarks in reference to the human subject, "for twins being most commonly of the same sex; and when they are of different sexes, it leads us to inquire whether the female, when grown up, has not, in some instances, less of the true female character than other women, and is not incapable of having children." "In warm countries," Sir Everard adds, "nurses and mid wives have a prejudice that such twins seldom breed."[2]

In reference to this last remark, it is not unimportant to observe, that, as I have repeatedly found during the course of my inquiries

[1] The tendency to the production of twins in the human subject is sometimes so marked in particular families as to entitle it to be considered as almost a hereditary peculiarity. I know of one family, in the different branches of which twelve pair of twins have been born within three generations.

[2] *Comparative Anatomy*, vol. iii. pp. 333-4.

upon this subject, a similar prejudice in reference to the infecundity of human females born co-twin with males exists to a considerable extent among the peasantry of the Lothians, and has very probably been derived from the analogy of the free-martin cow. "The mischief," justly observes a late physiological author, "to which the opinion might give rise, in causing a girl to be rejected as a wife for a defect, or taken for an excellence, according as sterility might be regarded, which she did not possess, is incalculable."[1]

The truth or falsity of the opinion itself can only be satisfactorily settled by an appeal to a sufficient number of accurately ascertained histories of cases in which women born co-twin with males have reached an adult age and become married.

I have collected what may probably be considered as a sufficient number of such cases for forming some just conclusions upon this subject.

Before, however, bringing forwards the results derivable from these collected cases, as bearing upon the question of the fecundity or sterility of human females born under the circumstances in question, I may, in the first place, mention that instances of twins in the human subject, of whom one child is male and the other female, seem not to be at all rare in their occurrence, though the contrary position is generally believed, and, as we have seen, was assumed by Home, and made by him at one and the same time a deduction from, and an argument in favour of, the particular theory which he held in respect to sexual development. In proof of this statement, I have analysed the records of all the labours that occurred in the Edinburgh General Lying-in Hospital from 1823 to 1836, both years included, as well as the published returns of all the cases occurring in the Dublin Lying-in Hospital from 1787 to 1793 as given by Dr. Clarke, and from 1826 to 1833 as given by Dr. Collins,[2] as also those occurring in the London Maternity Charity from 1828 to 1840,[3] which are the only returns that I am aware of in which the average number of twin labours and the sexes of the different co-twins have been noted. The three following tables have been constructed from these reports. The first of them shows the average number of twin labours as they occurred in these institutions respectively; the second presents the sexes of the

[1] See footnote at page 74 of Dr. Fletcher's *Rudiments of Physiology*.

[2] Dr. Collins' *Practical Treatise on Midwifery*, table beginning p. 331.

[3] Dr. Ramsbotham's *Principles and Practice of Obstetric Medicine and Surgery*, p. 621, footnote.

different pairs of twins as they occurred in each; and the third illustrates the proportion in which the differently-sexed co-twins were to the general number of labours.

I. Total number and proportion of twin-labours.

	Total number of Labours.	Number of Twin Labours.	Proportion of Twin Labours.
Edinburgh Hospital . .	2,888	46	1 in 63
Dublin Hospital (Clarke) .	10,337	184	1 „ 56
Dublin Hospital (Collins) .	16,414	240	1 „ 65
London Maternity Charity .	29,489	318	1 „ 93
	59,178	788	1 in 75

II. Sexes of the different co-twins in the above 788 cases.

	Two males.	Two females.	Male and female.	Tot. number of twins.
Edinburgh Hospital . .	16	17	13	46
Dublin Hospital (Clarke) .	47	66	71	184
Dublin Hospital (Collins) .	73	67	100	240
London Maternity Charity .	93	111	114	318
	229	261	298	788

III. Proportion in which the differently-sexed co-twins occurred to the whole 59,178 cases of labour:—

Male and female twins once in every 199 labours.
Two female twins once in every 226 labours.
Two male twins once in 258 labours.

The result of these two last tables goes to show, in opposition to the opinion of Sir Everard Home, that twins of opposite sexes are not by any means uncommon.[1] And this circumstance, of co-twins of opposite sexes occurring so proportionally frequent, may, perhaps, be adduced as bearing somewhat against the opinion of M. Girou, that the sex of the offspring is determined by the sex of that parent whose reproductive power or organism (*puissance prolifique*) is at the time of conception either absolutely or relatively in the greatest degree of vigour.

But to return from this digression. The only data hitherto

[1] As far as the data of these tables go, they would seem also to show that, among twin births as a whole, more female than male children are produced. Out of the 1576 children born in the above 788 twin cases, 756 were male, and 820 female.

published, so far, at least, as I am aware, containing an appeal to actual facts for the determination of the question of the fecundity or infecundity of the human female, when born co-twin with a male, are to be found in a short paper published by Mr. Cribb, in the *Medical Repository* for 1823,[1] and in the notice of a single case of this kind brought forward by the late Professor Meckel, in his essay on Hermaphrodites in Reil's *Archives*.[2]

In the paper referred to, Mr. Cribb has adduced the histories of seven married women, who were born co-twin with males, of which the following is the result:—six had a family; one had no children, though married several years; or one in six was without issue.

The woman mentioned by Meckel was a mother.

I have endeavoured to obtain as accurate and authentic reports as possible of the married history of various females born co-twin with males, and have so far been successful in gaining such information as I could implicitly rely upon in relation to 113 females born under such circumstances.[3] Of these 113 female co-twins, 103 had a family; 10 had none; or about one in ten was without issue. Of the ten cases in which there was no family, 1 had been married above five years; 9 from ten to forty years.

The history of the male co-twin in the 103 cases in which the female was productive was as follows:—in 53 he was the father of a family; in 24, he died in early life, or unmarried; in 8 he remained unmarried; in 2, he was married, but had no issue; and in 14, his history could not be accurately ascertained.

In addition to the above cases of twins of opposite sexes, I have traced the married history of the female in four instances of triplets, in which there were born either two males and one female, or two females and one male.[4] In all of these four cases the female, whose history I ascertained, had a family. In a case of quadruplets, recorded in the *Medical Repository* for 1827, there were three males

[1] *London Med. Repos.* vol. xx. pp. 213-16.

[2] Reil's *Archives für die Physiologie*, Bd. xi. p. 282.

[3] For assistance in the collection of these cases, I am much indebted to various professional friends, and particularly to Mr. Angus of Holytown, Mr. Girdwood of Falkirk, Dr. Gilchrist of Leith, and Dr. Cowan and Mr. Carmichael of Edinburgh. Tables, containing the name, address, and other particulars of each case, are in the hands of the Secretary of the Medico-Chirurgical Society.

[4] In one of these cases of triplets the three, two males and one female, all reached adult life. Dr. Merriman (*Synopsis of the various kinds of Difficult Parturition*, 4th edition) observes, p. 260, "So many years had elapsed, notwith-

and one female. The males were all reared, and the female became herself the mother of triplets.

If we unite together all the various facts I have alluded to, we shall have the married history of 123 females born co-twin with males. The results, so far as they refer to the question we are discussing, may be stated in the following form: Of 123 females born co-twin with males, 112 had a family; and 11 had no issue, though married for several years. In other words, the marriages of the females, born under the circumstances we are considering, were *unproductive in the proportion of one in ten.*

It may at first sight be supposed that this result, though not fully bearing out, yet supports rather than otherwise the popular opinion and the statement of Sir E. Home, with regard to the infecundity of the female in twins of opposite sexes. Before, however, assenting to such a modification of the view, it is incumbent on us to inquire—

WHAT IS THE AVERAGE PROPORTION OF PRODUCTIVE AND UNPRODUCTIVE MARRIAGES IN GENERAL SOCIETY?

On this point I have been able to gain but little precise information from the statistical or physiological works that I have had an opportunity of consulting. I have made personal inquiry on the same matter of several of our most eminent statisticians, without being able to obtain any accurate facts bearing on the subject. In the *Dictionnaire des Sciences Médicales*,[1] it is stated that Hédin, a Swedish minister, had noticed that in his parish, composed of 800 souls, one barren woman is not met with for ten fertile. It is further stated, that Frank asserted, but from what data is not mentioned, that it would be found on investigation, that in most communities containing 300 to 400 couples, at least 6 or 7 would be sterile, without anything in their physical condition to explain the fact. It seems to have been from this assertion of Frank's, that Burdach, who is almost the only author who even alludes to the

standing repeated inquiries, before I could meet with a well-authenticated instance of three children at a birth being all reared, that I began very much to doubt the fact." Besides the above, three other well-authenticated instances have been reported to me of triplets being viable and reared to maturity. Most certainly, however, one or more generally die shortly after birth.

[1] Vol. vi. p. 245. See also *Neue Abhandlungen der Schwedischen Akademie der Wissenschaften*, vol. xi. p. 70.

matter, has given the general statement that one marriage only in 50 is unproductive.[1]

For the purpose of ascertaining the point by numerical data, I had a census taken of two villages of considerable size—viz. Grangemouth in Stirlingshire, and Bathgate in West Lothian,[2]—the one consisting principally of a seafaring population, and the other of persons engaged in agriculture and manufacture.

The following form the results in these two places:—

Of 210 marriages in Grangemouth, 182 had offspring; 27 had none; or about one marriage in 10 was without issue.

Of the 27 unproductive marriages, all the subjects had lived in wedlock upwards of five years, and in all the female had been married that period before she reached the age of 45.

Again, of 402 marriages in Bathgate, 365 had offspring; 37 had none; or about one marriage in 11 was unproductive. There were at the same time living in the village 122 relicts of marriages, and of these 102 were mothers; 20 were not mothers; or about one in six had no family. In all, of 467 wives and widows, 410 had offspring; 57 had none; or about one marriage in 8 was unproductive. Of these last 57, six had not been five years married, and there were other six above the age of 45 when married. If we subtract these twelve, we have, of 455 marriages, 410 productive, 45 unproductive; or one in $10\frac{1}{9}$ without issue.

Returns such as I have just now adduced are exceedingly difficult to obtain, in consequence of no registers being anywhere kept, so far as I know, that could be brought to bear upon the question. If it had been otherwise, I would here, if possible, have gladly appealed to a larger body of statistical facts, in order to arrive at a more certain and determinate average of the proportion of unproductive marriages in the general community. For the purpose, however, of extending this basis of data, I have analysed with some care and trouble the history of 503 marriages detailed by Sharpe in his work on the British Peerage for 1833.

Among British Peers there were 401 marriages with issue; 102 without issue; or of
503 existing marriages among British Peers in 1833,

[1] Dr. Allen Thomson's excellent Essay on Generation, in Todd's *Cyclopædia*, vol. i. p. 478, footnote.

[2] My young friend, Mr. Thomas Girdwood of Falkirk, was so good as make the census of Grangemouth for me. For the data relative to Bathgate, I am indebted to the kindness of Mr. William Dick of that place.

74 were without issue after a period of five years. Of those who had not yet lived in the married state for five years, 28 were still without family; and in Burke's Peerage for 1842, there still remained among these 28 marriages,

7 without issue, making

—

81 as the total number of unproductive marriages among the original 503; or the proportion of the unproductive to the productive marriages among this number is, as nearly as possible, 1 in $6\frac{2}{7}$.

In the above calculation I have excluded eight unproductive marriages, in which the age of the husband at the date of marriage exceeded 56. These eight, however, ought to be deducted from the original sum of total marriages that were included, or, in other words, the 503 should be reduced to 495, and then the whole result would stand thus:—Among 495 marriages in the British Peerage, 81 were unproductive, or 1 in $6\frac{1}{9}$ were without any family.

The total result of the three series of facts that I have brought forward with regard to the average number of unfruitful marriages may be tabulated, then, as follows:—

	Total marriages.	Marriages without issue.	Proportion of unprod. marriages.
In Grangemouth .	202	20	1 in $10\frac{1}{2}$
In Bathgate . .	455	45	1 „ $10\frac{1}{9}$
In British Peerage .	495	81	1 „ $6\frac{1}{9}$
	1252	146	or 1 in $8\frac{4}{7}$

We thus see that if the marriages of females born co-twin with males are, as we have found them, unproductive in the proportion of 1 in 10, they do not in this respect exceed the degree of unproductiveness of marriages in other portions of the general community. Nor would I be inclined to forego this deduction, even if the average of unproductive marriages in society should be found, on a broader and more extensive basis of data, to be less than the above facts would seem to show. For certainly my own impression is, that probably I have had reported to me, and have entered among my notes and calculations, a greater proportional number of unproductive females among opposite-sexed twins than may actually exist. In relation to such a question as the present, all minds are too liable to be impressed with and recollect instances illustrative of the supposed rule and common opinion, whilst the apparent exceptions to it are

unattended to or forgotten. In the earlier part of the inquiry I happened to take notes of several cases that had, in this way, been long stored up, by those that reported them to me, as evidence of the infecundity of the female co-twin, and who deemed them so far to afford sufficient proof of the popular opinion. The latter part of the investigation has, in a great measure, if not entirely, escaped this source of fallacy.

Before finally attempting to draw all the conclusions that are deducible from the facts we have collected, let us consider for a moment the question under another point of view, and inquire—

WHAT IS THE AVERAGE PRODUCTIVENESS OF MARRIAGES IN GENERAL, AND DOES THAT OF THE FEMALE IN OPPOSITE-SEXED TWINS COME UP TO THE COMMON STANDARD?

Various authors, in treating of statistics and population, have calculated the average degree of fecundity of marriages in different climates and districts, as Malthus,[1] Macculloch,[2] Hawkins,[3] Saddler,[4] Sussmilch,[5] Quetelet,[6] and others.[7] Their observations show this average to vary from the number of 3 children to each marriage as a minimum, to $5\frac{1}{2}$ or $5\frac{8}{10}$ as a maximum. In an elaborate investigation into the subject made by Benoiston de Châteauneuf,[8] that eminent statistician states, as average results upon a large series of observations, the following general conclusions :—

In southern Europe, 457 births result from every 100 marriages, or about $4\frac{1}{2}$ from each ; in northern Europe, 430 births result from every 100 marriages, or about $4\frac{3}{10}$ from each.

Mr. Farre[9] calculates the mean fruitfulness of marriages in England in ordinary periods to be in every

Marriages.	No. of children.	Prop. of children to each mar.
100	420	$4\frac{2}{10}$

[1] *Essay on the Principle of Population* (1803), p. 224.
[2] *Statistics of the British Empire*, vol. ii. p. 413.
[3] *Elements of Medical Statistics*, p. 221.
[4] *The Law of Population*, vol. ii. p. 380, etc.
[5] *Göttliche Ordnung*, Th. iii. s. 64.
[6] *Sur l'Homme, ou Essai de Physique Sociale* (1836), Tome i.
[7] See a collection of evidence on this point in the *Report from His Majesty's Commissioners for inquiring into the Poor Laws* (1834). Appendix F of *Foreign Communications*, and table in Preface, p. xcix. etc.
[8] *Annales des Sciences Naturelles*, Tome ix. p. 431. "Notice sur l'Intensité de la Fécondité en Europe au commencement du dix-neuvième siècle."
[9] See Macculloch's *British Empire*, l. c.

In relation to Scotland, Benoiston de Châteauneuf states,[1] that he had the patience to go over the tables of population in seventeen out of the twenty-one volumes of Sir John Sinclair's *Statistical Account* of this kingdom, and found in every

Marriages.	No. of children.	Prop. of children to each mar.
100	430	$4\frac{3}{10}$

What is the usual degree of fruitfulness in married life of females born co-twin with males? To make as near an approximation as possible to the solution of this question, I have added together the total number of children produced by 94 of those female co-twins, whose history I have collected. We omit the others remaining on the list, merely because we have no notes taken of the exact extent of their families. The total number of children produced by the 94 mothers alluded to amounts to 409; or the result, when stated in relation to the standard of every 100 marriages of them, would be as follows:—In

Marriages.	No. of children.	Prop. of children to each mar.
100	424	$4\frac{2}{10}$

But in 15 of the 94 cases, the mother had as yet only one child at the time her case was noted, having either only lived in wedlock for a year or two previously, or the single child being the result of illegitimate intercourse. If we deduct these 15 cases only, though other mothers with a young and increasing family of two or three children might be excepted from the calculation in the same way, and on the same grounds, we shall then have 79 mothers producing 364 children; or, again, to state it in reference to the supposed standard of 100 marriages, we have this result as the degree of fruitfulness of such co-twin females:—In every

Marriages.	No. of children.	Prop. of children to each mar.
100	460	$4\frac{6}{10}$

The whole inquiry detailed in the few preceding pages forms an apt illustration of an old remark, that in medicine it often requires a much greater extent of observation and research to disprove satisfactorily an alleged and accredited fact, than was ever expended, either upon the original development or subsequent confirmation of it. In the present instance, the results have turned out to be perfectly contradictory of the opinion which I, in common with others, held regarding the infecundity of the female in double-sexed twins,

[1] *Annales des Sciences Naturelles*, Tome ix. p. 447.

when I commenced looking into the subject; and instead of finding my preconceived ideas confirmed by the investigation, they have, on the other hand, been completely confuted by it. For the data that I have adduced do, so far as they go, evidently prove—

1. That, in the human subject, females born co-twin with males are, when married, as likely to have children as any other females belonging to the general community.

2. That, when they are married and become mothers, they are, in respect to the number of their children, as productive as other females.

3. That the same law of the fecundity of the female in opposite-sexed twins seems to hold good among all our uniparous domestic animals, with the exception of the *cow* alone.

Indeed, the strong confirmatory evidence which the preceding inquiry affords of this last exceptional point constitutes one of its most interesting results. For certainly it cannot but be considered as an extraordinary circumstance, that, in the cow, the twin existence in utero of a male along with a female should, as a general principle, lead—

1. To so great a degree of malformation as we have described, in the sexual organs, and in the sexual organs only.

2. That this malformation should be limited entirely to the reproductive organs of the female twin, while those of the male twin are perfectly and fully developed.

3. That this sexual malformation should, apparently so far as we yet know, occur in the case of twins in the cow only, and in this species of uniparous animal alone. The curiosity of the fact becomes heightened and increased when we recollect that when the cow has both twins of the same sex, as two males or two females, these animals are always both perfectly formed in their sexual organisation, and both capable of propagating. The whole series of circumstances, when considered in conjunction with each other, seems to form, in relation to the origin of malformations, one of the strangest and most inexplicable facts to be met with in the study of anormal development.

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